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ORIGINAL ARTICLES.

DISEASE OF THE ACCESSORY CAVITIES OF THE NOSE.[1]

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IT is only in very recent times that much attention has been given to disease of the accessory cavities. This seems a little remarkable when we consider that this is the most serious of all nasal disorders, is of very common occurrence, and presents symptoms that are very pronounced, very annoying to the patient, and easily recognized by the physician. The accessory sinuses, four in number on either side, are the maxillary, the frontal, the ethmoidal, and the sphenoidal. These communicate with the nasal cavities proper, through small openings which allow of an interchange of air during health, and through which pus is discharged into the nasal chambers during disease of these sinuses. We believe that these cavities have no very important physiological function. While they are known to serve as reservoirs for warm air, and in this way contribute a little warmth and moisture to the air taken into the lungs, yet the air emptied from these cavities is so small in amount, compared with the volume of air taken in at each inspiration, that it must be considered as insignificant physiologically. We think the real design of these cavities was to afford lightness to the bones of the face without compromising their strength or symmetry.

Any of these cavities may become diseased, which is usually made known by a purulent discharge from the nose, more or less offensive in character, and which does not yield to ordinary treatment. Such chronic discharges never come from the mucous membrane of the nasal fossa, for the ordinary forms of chronic rhinitis are not accompanied by a purulent discharge; and when pus is found coming from the nasal cavities it may be accepted as conclusive evidence of diseased bone; and, on inspection, it will nearly always be found that the pus is running from one of the accessory sinuses. The matter discharged from the diseased sinus may vary in its consistency, and odor, as well as in the frequency of the discharge.

An analysis of the cases occurring in our practice for the past five years shows the total number of patients suffering from disease of the accessory cavities to be thirty-five. Of these thirty-five cases there were twenty-four cases of disease of the antrum of Highmore, ten cases of ethmoid disease, and one case of disease of the sphenoid cells. After having seen several cases of chronic empyema we were led to observe that, in the majority of the cases where the disease was of long duration, mucous polypi were found in the nose. We readily concluded that this was not accidental; but that the empyema stood in a causative relation to the intranasal tumors. Extended observation has greatly strengthened us in this belief. For out of a total of thirty-five cases of empyema polypi were present in twelve, or about thirty-four per cent. of the whole number. Eliminating from the calculation cases of less than one year's standing, and basing our estimate on the chronic cases alone, we find mucous polypi to have been present in about sixty-three per cent. of such cases. It would appear that polypi are most likely to be found where disease has existed for some time; and that they are found associated with disease of the ethmoid cells more frequently than elsewhere. Of the ten cases of ethmoid disease polypoid growths were present in seven. Grünwald has recorded seventy cases of accessory sinus disease. Of these seventy cases polypi were present in thirty-three, or forty-seven per cent. As his cases were all grouped together we have reason to believe that the percentage would have been much higher had the cases of recent standing been excluded from the calculation. Hence we reach this practical conclusion: That in quite a large percentage of the cases where polypi are found they are the result of chronic suppuration; and that the presence of such growths should always lead one to suspect that there is diseased bone, and hence calls for an inspection of the accessory sinuses. The antrum of Highmore, and the ethmoid cells, furnish by far the greatest number of empyemas.

As to the etiology of antrum disease we shall say only a few words. That carious teeth are often the primary cause of pus in the antrum we have no reason to doubt; and this important fact must not be lost sight of in studying the etiology of a case. Quite a large proportion of the cases

[1] Read before the Tennessee State Medical Society, April, 1896.

of empyema owe their existence to an abnormal or disordered condition of the nasal cavities. Many patients date the beginning of their ailments from the taking of a severe cold or the grip. During the stage of active inflammation there is an excessive outflow of mucus or mucopus into the antral cavity; and the swelling of the mucous tissue around the orifice, together with the swelling of the turbinated tissues in the nose, causes a retention of these inflammatory products, and thereby results the condition of empyema, which becomes chronic and persistent. Stenosis of the nasal cavity, by whatever cause produced, is liable to be followed by disease of the antrum. Hence nasal tumors, hypertrophic rhinitis, foreign bodies, and traumatisms, may all indirectly lead to antral disease by closing the hiatus, causing the retention of decomposing secretions. Deflection of the nasal septum, which makes one respiratory chamber unusually large at the expense of closing the other, can in the same way lead to antral disease on the side of the closed nostril.

The symptoms observed in the course of this disease are not always sufficient to establish a diagnosis beyond a question of doubt. In most cases, however, the symptoms are marked, and the evidences of disease are unmistakable. There is in some cases a sense of pain about the cheek, radiating pains about the eye, and pain or soreness in the teeth, when pressure is made over the canine fossa. When there is a closure of the hiatus and a retention of the secretions, there is apt to be distention, extreme tenderness, and a bulging upward of the floor of the orbit, causing exophthalmos and double vision. The discharge from the nose is a very annoying symptom, necessitating the frequent use of the handkerchief. The pus is generally thick like cream, and often has a fetid disagreeable odor. This incessant filthy discharge is the most unpleasant of all the symptoms, and is the one which usually drives the patient to seek relief. If firm and equal pressure be made over the two antra, one healthy and the other diseased, a difference in sensation is experienced by the patient; the comparison shows a tenderness on the diseased side; the obtuse sensation lasting for a time after the pressure has been removed. This is a diagnostic point on which I have learned to place a good deal of reliance; and a careful rhinoscopic examination will be likely to reveal a discharge of pus, creamy in color and consistency, running from the region of the middle meatus. This pus when wiped away will sometimes quickly reappear at the same point, and can thus be seen trickling down from the natural opening. By a bending forward of the head the flow of pus from the antrum will be accelerated; a fact to which attention was called by Boyer. It should not be forgotten that the infundibulum has its opening in the middle meatus, not far from the antral opening; and hence a purulent discharge from the frontal sinus would show itself in nearly the same locality as one from the antrum of Highmore.

In our endeavors to obtain facts from which we can make a correct diagnosis we may often adopt the following procedure with good results. The nasal cavity is thoroughly cleansed of all secretions, a four per cent. solution of cocain is then applied for the twofold purpose of shrinking the tissues and producing local anesthesia. We take a syringe holding about two drams. To this there is fitted a long narrow cannula which is bent at a right angle, near the distal end. The syringe is filled with fluid, the cannula introduced into the nose, and the bent point slipped along the middle meatus until it drops into the antral opening. The fluid is then injected into the antrum, and if pus is present it can be seen to pour out from the ostium maxillare as the fluid enters. The pus thus discharged usually has a foamy appearance, owing to its sudden mingling with the fluid injected. Deviations of the septum and other hypertrophic changes will occasionally hinder us in making this test.

Where any uncertainty exists we may open the antrum. The perforation can be made through the nose by penetrating the outer wall through the inferior or middle meatus, or through the alveolar process after the removal of a tooth, or preferably in the canine fossa. In this way we are able to find the pus if there be any, and having found it, we already have an opening through which we can proceed to medicate the diseased cavity.

Opening of the antrum from the nasal fossa does not afford thorough drainage, for the reason that the floor of the antrum is lower than that of the nose. The opening presents difficulties in keeping it from closing and is not convenient of access. The most serious objection to boring upward through the alveolar process is that a tooth must nearly always be sacrificed in the procedure. Again, the wound has to be plugged to prevent food from entering the cavity; and by closing the hole with a plug we have, in a degree, thwarted the purpose for which the operation was done. I prefer to enter the cavity at a point a little above and between the roots of the second bi-

cuspid and first molar teeth. If the first molar is out we prefer to enter directly above, or through the lower portion of the malar ridge. A pledget of cotton, saturated with a ten per cent. solution of cocain, is placed on the spot selected for the operation. After a few minutes the cotton is removed, and a few drops of a four per cent. solution is injected into the submucous tissue; a small amount of the solution should be injected beneath the periosteum, which can always be done by a proper manipulation of the needle. In ten minutes the local anesthesia is completed to an extent that the perforation can be made almost without pain. The drill, or trephine, whether run by an electric motor or by hand, is passed in a direction upward, backward, and inward, making an opening of sufficient size for the easy irrigation and medication of the diseased cavity.

After the opening has been made the important question arises as to how it shall be kept open; and by what means the diseased cavity is to be irrigated. The old method of fastening the tube into the opening by wiring it to the teeth was bunglesome and unsatisfactory. We have devised a means of treating these antrum troubles, which offers some advantages over other methods, and is, at the same time, free from some of their disagreeable features. We use a tube which is self-retaining, and can be worn for months without discomfort or inconvenience to the patient. The irrigation is done by the patient himself, and as many times a day as is thought necessary. The opening in the antral wall is made by a drill of definite size, about five millimeters in diameter. The tube is made of a size to fit exactly the opening made by the drill, and is slightly swollen on the distal end so as to make it self-retaining. To prevent it going too far into the cavity, as well as to prevent the end projecting into the buccal cavity from becoming covered over with mucous membrane, this extremity of the tube is provided with a head or smooth rim. This end of the tube is also sloped so as to make it lie smoothly against this slanting bone-surface through which it passes. The tube is made of silver, and is five-eighths of an inch in length. It is introduced by means of a pilot. The tube being in position the patient takes fluid into his mouth, and by a pumping motion of the cheeks causes it to pass rapidly into the antrum, and thence by the natural opening into the nose. In this way several ounces of fluid can be passed through the cavity in a few minutes. The patient should be ordered to do this several times a day.

The irrigation in the chronic cases has usually to be kept up through a long period, in some instances for a year or two. Where the case progresses unfavorably, the symptoms showing no sign of abatement, it will be found best to enlarge the opening to an extent that the cavity can be carefully explored. If polypi are found they should be removed; membranous partitions should be broken down if present, and dead bone surfaces carefully curetted. When the mucous membrane is much thickened, and covered with fungosities, and flabby granulations, due to long-continued suppuration, it should be curetted carefully throughout the whole cavity.

The treatment of ethmoid disease is mainly surgical. The aim is to reach the diseased cavities and effect their free drainage, as well as a removal of the carious bone. There are two pathological conditions, either of which may hinder our approach to the seat of trouble. It is quite usual in these cases to find hypertrophy of the middle turbinated body sufficient to conceal all view of the parts beyond it. It is no less common, especially in the chronic cases, to find the nose blocked with mucous polypi. In either case the first thing to do is to remove the hypertrophic conditions, and thus effect an unobstructed entrance to the diseased sinuses. By careful inspection and use of the probe we can usually locate the source of the discharge. In operating on these cells our aim should be to do thorough work, remembering at the same time the delicate structures that surround the field of operation. In front and toward the medium line we have the cribriform plate and olfactory nerves. To the outer side is the infundibulum, and a frail bone tissue, which separates the cells from the orbit. In doing these operations we should take our bearings carefully and proceed cautiously. The curette is the instrument best suited for removing the diseased tissue. Forceps are likewise useful, and, as a supplement to the curette, afford a safe means of removing the carious bone. With these instruments we can, as it were, feel our way, and by this tactile sense we are able to discriminate between healthy and diseased structures. A rough or grating sensation will indicate that the probe is in contact with carious bone. Thorough removal of all diseased tissue is the end to be sought, and to accomplish this we may have to repeat our operations from time to time, as the work is not likely to be completed at one sitting, especially if done under local anesthesia.

In addition to the surgical treatment the nasal fossa must be kept clean. The foul accumula-

tions should be washed away by frequent irrigation with some mild antiseptic solution. This will add greatly to the patient's comfort and be of material aid to the surgical treatment.

THE TREATMENT OF SYPHILIS BY MEANS OF THE TOXINS OF ERYSIPELAS AND THE BACILLUS PRODIGIOSUS.

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CASES have been reported by Mauriac[1] and Rudolph[2] of individuals who, while suffering from the cutaneous manifestations of syphilis, have been attacked by erysipelas, the result being the disappearance of the syphilitic eruption from the skin. The perusal of this literature as well as of the articles of Coley[3] on the treatment of sarcoma by means of the toxins of erysipelas and *Bacillus prodigiosus*, led the writer to experiment with these toxins in the treatment of syphilis. While the number of cases experimented upon, the histories of which are recorded below, are insufficient data from which to draw a positive conclusion, the tentative conclusions arrived at by the author are as follows:

(1) These toxins can be administered hypodermically in proper doses, with no danger of the formation of an abscess at the point of the injection, and with practically no danger of any serious constitutional reaction following their administration. (2) That in almost every case changes in the appearance of the cutaneous manifestations of syphilis macroscopically can be plainly observed in from forty-eight to seventy-two hours after the commencement of the injections. (3) That it is apparently at the present time extremely difficult to procure solutions containing these toxins of any uniformity of strength, one preparation producing rapid changes, another slight changes. It is to be regretted that in taking clinical notes of the cases, the proper record concerning the administration of the different supplies of the toxins was not kept, the necessity for this record not being as apparent when the investigations were first begun as developed later. (4) The reappearance of the cutaneous eruption in two cases would tend to show that we must not conclude from the simple disappearance of the cutaneous manifestations, that any permanent change has taken place in the course of the disease. When erysipelas itself apparently caused the resolution of the cutaneous manifestations, as reported in the histories of the cases of Mauriac and Rudolph, fresh eruptions appeared later on.

It was found extremely difficult to keep these patients under observation as long as was desirable, from the fact that they were not confined in hospitals, that they principally belonged to the floating population of New York, and in several instances having obtained employment outside of the city, were on that account removed from observation. I wish to express my deep gratitude to Dr. Coley, who very kindly presented me with the solutions which I used in these cases, being identical with those which he had found of benefit in cases of sarcoma under his care, and also for kindly advice concerning the administration of the toxins.

I was supplied by Dr. Coley with two solutions, one that had been filtered and sterilized by the addition of an antiseptic, the other sterilized by heat and unfiltered. I used, during the latter part of my experiments, the unfiltered preparation exclusively.

CASE I.—April 9, 1896. J. M., aged twenty-nine; occupation, mason. First appearance of the initial lesion occurred July 15, 1895. This, according to his history, was followed by spots on the body five or six weeks later. Since that time he has been almost continually under treatment by means of pills, liquid medicine, and inunctions; had been in the Philadelphia Hospital for some time, and treated by divers physicians, privately and in dispensaries. Four weeks previously the present eruption appeared, while he was still taking small pills. He has pain on the top of his head, much worse at night, sleeps poorly, and his legs are weak. He has become reduced in weight from 174 to 135 pounds; has large scaling syphilid on left shoulder and on right temple, and a few large flat papules on forehead. One minim of filtered solution was administered in the left shoulder.

April 10th: Eruption commencing to fade. Complains of sleeplessness. One minim filtered solution.

April 11th: Eruption about the same; no change. One minim.

April 12th: Eruption fading; complains of general feeling of malaise. Did not administer solution.

April 14th: Feeling better; sleeping better. Administered one minim.

April 15th: Administered two minims.

NOTE made May 9th.—Have not seen patient since April 15th. At that time, eruption had entirely faded, and had been fading regularly since

[1] "Étude Clinique sur l'Influence Curative de l'Erysipèle dans la Syphilis," Paris, 1873.
[2] Dr. Rudolph of Magdeburg, *Centralblatt f. Innere Medicin*, February 1, 1896.
[3] The indications for non-operative local treatment of tumors; the value of toxins.—W. B. Coley, M.D., N. Y. State Med. Assoc., October 16, 1895.

the commencement of the administration of the toxin.

Case II.—J. R., first seen April 16, 1896, gives history of initial lesion three months ago. At present he has a general glandular adenopathy, erythematous syphilids, a few moist papules and condylomata around anus, sore throat, pain in legs, etc. Administered two minims filtered solution.

From the 17th to the 21st, there was an increase of one minim in the administration each day. On the latter date, the pain had disappeared; glandular adenopathy diminished; condylomata and papules had almost entirely disappeared. From the 22d, when seven minims were administered, there was a daily increase of one minim until the 27th. On that date, the 28th and the 29th, twelve minims were administered. May 8th: Patient was discharged with no evidence of syphilis apparent anywhere, except that the very slightest enlargement of the inguinal glands could be felt.

On May 16th and June 7th, there was no evidence of any return.

Case III.—J. M., first seen May 2, 1896; aged thirty-four; occupation, laborer. History of initial lesion seven years ago, followed by cutaneous manifestations which persisted most of the time during three years. Never had any treatment. The present cutaneous manifestations have only recently appeared. Headache, worse at night; numerous scars; a number of large flat papular syphilids on body; scrotum covered with moist excoriations. Gave five minims of the filtered solution.

On May 4th, six minims were given; May 5th, seven (complains of headache and backache); May 6th, eight (syphilitic papules fading); May 7th, nine; May 8th, ten; May 9th, five, of the unfiltered. Papules had then almost disappeared; some headache and pain in shins; pains better than for several days; scrotum is entirely healed; only application having been of pure vaselin.

On May 10th and 11th, five minims unfiltered were administered, and from the 12th to the 16th inclusive ten minims daily were administered.

May 20th: A few flat papules have made their appearance on back of neck. Has had no headache or backache. Occasionally has pain in legs. Three days ago gums began to be sore; has slight excoriation of gum on front of left incisor. Gave ten minims of the unfiltered.

May 21st: Large flat papules, which had made their appearance on back of neck, are much dried up, and have become scaly since the day before.

May 22d: Ten minims of unfiltered solution; papules drying up.

May 28th: No indications of syphilis outside of the old scars, except the stains of the flat papules between the legs, and the papules on the neck. These are scaly, and present about the same appearance as when last seen. Gave ten minims of the unfiltered.

Note.—Patient has not been seen by me since the 28th of May.

Case IV.—P. M., aged twenty-six. May 2, 1896. Has elevated and excoriated chancre on outside of glans penis, as large in circumference as a quarter of a dollar; glandular adenopathy; erythematous syphilid; a few small miliary papules on both the anterior and posterior surfaces of the body. Injected five minims of the filtered solution.

May 3d: Surface of chancre changed in color, from bright red to pink.

May 4th: The chancre is healing. Six minims.

May 5th: Gave seven minims. Eruption has faded in a marked manner; erythema practically disappeared; papules diminishing in number; feels better.

On the 6th, 7th, and 8th, ten minims were administered daily.

May 9th: Five minims of the unfiltered. Eruption has disappeared from front of body; chancre has much less irritated appearance, and there is a slight red zone surrounding it. Patient feels very well.

On the 10th and 11th, six minims unfiltered were administered daily.

May 12th: Five minims unfiltered. Patient has a bad headache, frontal, came on at four in the afternoon of May 11th, and during the night felt chilly and had fever. At present (12 M.) no pain; has oral temperature of 99° F.; eruption apparently slightly more prominent on neck.

May 13th: Headache. Had no injection.

May 14th: Better; no injection.

May 15th: Five minims of the unfiltered (slight headache).

May 16th: Five minims of the unfiltered; chancre healing; headache at 4 P.M.

May 17th: Chancre healing in a marked degree; body clear. Omitted injection.

May 18th: Injection of two minims unfiltered.

May 19th: Two minims unfiltered; slight headache.

On May 20th, gave two minims unfiltered.

May 21st: Four minims unfiltered (complained of no headache the day before).

On the 22d, 23d, and 24th, three minims. All cutaneous evidences of syphilis have disappeared, except slight scab on chancre.

On the 25th and 26th, three minims were administered.

May 27th: Having exhausted my supply of Coley's solution, used five minims of plain erysipelas toxin.

May 28th: Gave ten minims of same solution.

May 29th: Slight headache, beginning the day before at 3.30 P.M., continuing till 10 A.M.; slight injection having been administered at 10 A.M.

June 3d: Discharged, with no evidence of syphilis, except very slightest enlargement of the inguinal glands to be felt. Ordered him to report once a week.

Note.—Patient reported for observation once

or twice during the early summer, with no indications of any return of the cutaneous manifestations. He has not been seen since.

CASE V.—May 16th. W. O. B., aged twenty-three. Six years ago initial lesion on penis, sore throat, tongue, etc. Had been treated at Bellevue. One year ago had sore come out on elbow, which had been under treatment ever since by various physicians in dispensaries. The history given was that it would improve somewhat and then grow worse, but it never entirely healed since it first made its appearance. Two weeks ago, sore on the penis made its appearance. Has gumma size of a dollar, just above left elbow; has another on top of glans penis, which has eaten away the tissues to the depth of a quarter of an inch; was presented to Dr. Joseph Collins for inspection. Two minims of the unfiltered were injected.

May 17th: Patient did not appear.

May 18th: Marked change has taken place in appearance of gumma on elbow; it was dried up to a considerable extent. Gumma on penis apparently about the same. Patient states that elbow has not been so dry in a year and a half. No headache. Four minims of the unfiltered injected.

May 19th: Gumma on penis healing. Four minims of the unfiltered.

May 20th: Did not appear.

May 21st: Patient states that he has been ill with a headache, which came on the night of the 19th; the toxins were administered in the forenoon of that day; gumma on elbow much improved; patient states that it is no longer sore when he leans on it; gumma on penis previously excoriated, covered with a dry scab. Administered five minims of the unfiltered.

May 23d: Patient did not appear on the 22d; states that he had severe headache, accompanied with shooting pains, which came on about 8 P.M. on the evening of the 21st, and which lasted all night; did not have headache the night of the 22d. Administered two minims of the unfiltered. Both gummata have improved.

May 31st: Has been in the penitentiary since last seen, and has had no treatment of any kind in the interim. Gumma on penis is almost entirely healed; gumma on elbow, which had previously scabbed over, has lost its scab on the upper half, and there is a profuse gummy exudate. It is not in as good condition as when last seen. Administered ten minims of unfiltered.

June 1st: Has had severe headache and pain in bones since eight o'clock last night. Gumma on elbow has less irritated appearance. Patient states that he sleeps better than before having the treatment. Administered four minims of unfiltered.

June 3d: Has had no headache since last night. Administered three minims of the unfiltered.

From the 4th to the 6th, three minims of the unfiltered were administered daily; from the 7th to the 10th, five, when the gumma improved, filling in centrally from the edges.

NOTE.—September 25th. This patient has not been seen by me since June 10th. At that time, if my memory is correct, although there is no note in history book, the gumma on penis had healed. There had not apparently been as much improvement in the condition of the gumma on elbow from May 31st to June 10th, as there had been from May 16th to May 23d. Whether that may have been owing to the fact that I was using a different preparation of the solution during the second period, or whether the apparent usefulness of the injections had ceased, I am unable to state. This large gumma on the elbow was apparently healing in the same manner as the large chancre healed in Case IV, by the formation of a red zone around it on the outside showing, I presume, an increased phagocytosis. There was gradual filling in toward the center.

CASE VI.—J. McC., May 20, 1896; aged twenty; occupation, laborer. Initial lesion nine months ago. Two months ago (?) phimosis. General glandular adenopathy; very extreme enlargement of the glands of the left inguinal region; large number of papular syphilids scattered generally over the body; had had no treatment; sleeps well; has headache and sore throat. Administered two minims of unfiltered.

May 21st: Administered three minims of the unfiltered. No perceptible difference to be observed; had some headache.

May 22d: Papules much faded; patient states that some have become scaly that were not so before; large glandular enlargement in left groin considerably diminished. Administered five minims of the unfiltered.

May 26th: Administered five minims unfiltered; May 27th, ten (papules much faded; swelling of foreskin improving).

May 28th and 29th, being out of solution, gave ten minims of plain erysipelas toxin. No change.

June 21st: Eruption fading slightly; patient thinks a few new papules have appeared around anus.

From June 2d to June 10th, four minims of the unfiltered were administered. Then the patient was doing well; gained five pounds in weight; no sore throat; large number of the old papules have disappeared leaving stains; inguinal glands much diminished in size; extreme enlargement of those on the left side having disappeared.

On June 11th, there were administered five minims; 12th, four; 15th, six; from the 18th to the 26th, ten minims daily.

From June 27th to July 10th, ten minims daily of new solution.

NOTE.—At this time, not having seen much improvement, in fact very little, if any, change, either for the better or worse since the 10th of June, I felt that it was a duty I owed to the patient to adopt some more certain method of relief, and I stopped the administration of the toxins

and put him on inunctions of mercurial ointment, and a tonic. I saw him a few times after that, during which time he had improved somewhat, and then lost track of him through my absence from the city.

Case VII.—May 26, 1896. E. A., aged twenty-three; occupation, truckman. History of initial lesion three months ago; sore throat for a month; two weeks ago spots on body. Has marked erythema all over the body, and general glandular adenopathy. Five minims unfiltered.

May 27th: No perceptible change; gave five minims plain erysipelas toxin; 28th, ten; 29th, fifteen.

June 1st: Having obtained more of Coley's toxins, gave five minims of the unfiltered.

June 2d: Eruption much faded. Gave seven minims of the unfiltered; June 3d, five.

June 8th: Has not received any toxins since June 3d. Been feeling well, but occasionally had severe perspiration at night. Eruptions almost entirely disappeared, and glandular enlargement very slight.

June 9th: Six minims of the unfiltered.

June 10th: Only the very slightest erythema can be perceived on close inspection. Ten minims of the unfiltered given.

From the 11th to the 16th, gave ten minims of the unfiltered; 17th, twelve; 18th, fifteen; 22d, eighteen.

June 23d: No evidence of syphilis.

June 29th: Discharged, with no evidence of syphilis apparent.

Note.—This patient left the city to take a position in Long Branch, with instructions to report to me if he discovered at any time any further evidence of the disease. I have heard nothing from him since and infer that he is sufficiently well to attend to his occupation.

There were three other cases which I wish to mention briefly, though I shall give no detailed history here, for the reason that I discovered that in two of them potassium iodid unknown to me, had been administered while they were receiving treatment by means of the toxins, and the other was under observation for too short a time to determine the effect of the treatment.

Of the two who were treated with the potassium iodid in addition, one of them was an old man in feeble condition when he contracted syphilis, which was very shortly before he came under my observation. His was the only case in which there seemed to be a severe reaction after the administration of the toxins. He had a chill and considerable fever, and in his weak and enfeebled condition I did not think it justifiable to pursue a method of treatment of which we know so little as we do of this. So I put him upon inunctions and a tonic.

The other one had a papular syphilid, which disappeared with great rapidity, but he returned a few days after the last administrations of the toxins with a reappearance of two or three papules, showing that the administration of the toxins had not been efficient in prohibiting a fresh outbreak of cutaneous manifestations.

The third case came to me with persistent papular syphilid of the forehead, and an extensive excoriation of the mucous membrane at the angle of his mouth. His case had resisted ordinary antisyphilitic medication. He was under treatment for a very few days, during which time the papular eruption became very much improved. I could see no change whatever in the excoriation at the angle of the lip.

CLINICAL MEMORANDUM.

REPORT OF THREE CASES OF HYSTERECTOMY.

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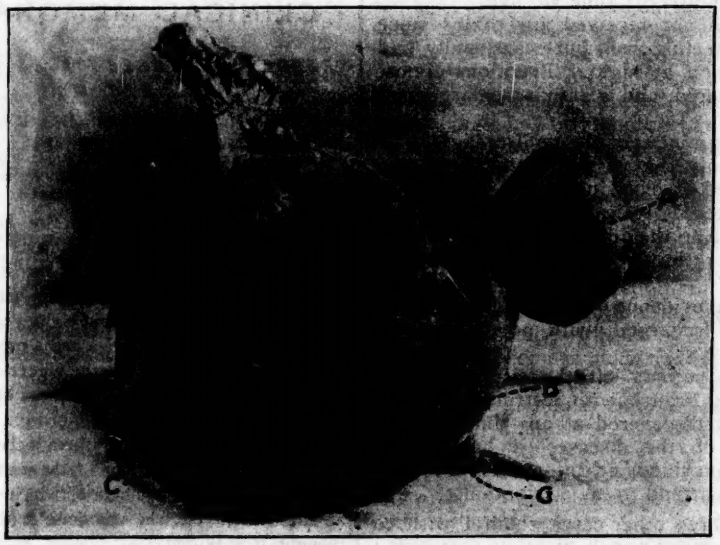
of Denver, Col.;
formerly director of gynecological clinic, Denver Medical College, and gynecologist to Arapahoe County Hospital.

Case I.—*Uterine Fibroma:* Mrs. E., aged thirty-five, American born, married, was never pregnant, dressmaker; gives history of having menstruated first when fourteen years of age, and of having had good health and a normal function up to about eight years ago, when she began to have dysmenorrhea and a prolonged menstrual flow. I saw her first during the winter of 1889 and 1890, and on examination, discovered a tumor about the size of a teacup, apparently occupying the right side of the pelvis, and extending about two or three inches above the pubic arch, and lying to the right of the median line. I could not decide at that examination, which was made without an anesthetic, what the character of the tumor was, but thought it a fibroid, and advised exploratory operation, which was declined. I saw the patient no more until January, 1895, when she consulted me, saying she was ready to have the tumor removed. The tumor appeared to be as large as a pregnant uterus at full term. The patient was not in good condition, being anemic and very nervous, with very profuse hemorrhage at the menstrual period, which lasted from ten to twelve days. Obstinate constipation was present. I put her on tonic treatment and rich diet preparatory to the operation. On the 19th of February, 1895, she was admitted to St. Luke's Hospital, and on the following day I operated. The anesthetic used was chloroform; there being a trace of albumin present in the urine, it was deemed best not to use ether. After rendering the vagina and the external parts thoroughly aseptic, I dilated the os, and introduced a probe, which went up into the uterine cavity its full length, about thirteen inches. This caused a profuse hemorrhage, and, without curetting the uterine cavity (the method I prefer), I douched out the uterus with bichlorid, 1–2000, and put a piece of iodoform gauze in the cervix, crowding it up several inches. The vagina was packed with iodoform

gauze. The patient was then placed in the Trendelenburg position. The first incision was from two inches above the pubic arch nearly to the umbilicus, and putting in my hand, I explored, finding on the right side and attached to the main tumor, a tumor, smooth, except some small nodules, resting against the kidney, about twice the size of a normal kidney. I enlarged the incision to within about two inches of the ensiform cartilage, in all about fourteen inches in length, turned the tumor out, and covered the intestines with sterilized towels, and packed sterilized towels in the upper part of the wound. Beginning outside the ovary and tube, transfixing the broad ligament with the ligature, I continued to the base of the broad ligament, tying the uterine artery when I came to it. I proceeded in like manner on the left side.



MRS. E.—CASE I. POSTERIOR VIEW.

A—Subserous tumor, that was resting over right kidney. B—Shows where posterior flap was taken. C—Shows os uteri. D—Ovary and tube, flattened by pressure. E—Submucous fibroid. F—Gauze, put between wall of uterus and tumor. G—Ovary and tube.

Then with a slight stroke of the bistoury, I cut through the peritoneum, making a semicircular flap posteriorly. (B, photograph 1.) I then dissected this flap down to the cervico-vaginal juncture, then, with a sound in the bladder as a guide, manipulated by an assistant, I took my anterior flap, going about one or two inches above the junction of the bladder with the uterus, and dissected this down also. The next step was to sever the uterus from the vagina at its juncture, going into the posterior cul-de-sac first, an assistant's finger in the vagina as a guide. The uterus was separated completely, and the top of the vagina at once closed with sterilized catgut. The cavity or cup formed by the flaps of peritoneum was then sponged out until quite dry, the peritoneal flaps united by continuous lock-stitch suture of medium-sized catgut. The abdomen was then washed out with normal salt solution, sponged with sterilized sponges, and the abdominal incision closed with interrupted sutures of silkworm-gut, about one-half inch apart, transfixing with the same suture the peritoneum, muscles and skin; dressed with iodoform, iodoform gauze, sterilized gauze and cotton, and held in place by adhesive strips and a bandage. I also put the same kind of dressing over the vulva, held by a T-bandage.

During the operation, several hypodermic injections of strychnin, one-twenty-fifth of a grain, were given, and this was kept up at intervals of two hours for several days; also an occasional hypodermic of nitroglycerin, one-hundredth of a grain, was given. Nutritive enemata: First whisky and black coffee, afterward whisky and peptonized beef juice were kept up for several days. Nothing else in the way of nutrition was given until the bowels moved freely, which was on the third day. The quantity of urine passed the first twenty-four hours was twenty-seven ounces. This, with absence of other symptoms, caused me to feel that no injury had been done the ureters. The patient left the hospital at the end of the third week. Was sitting up and walking a little at the end of five weeks, and at this writing, four months after operation, appears to be in perfect health. The tumor weighed fifteen pounds after removal, and was pronounced a fibroma by Dr. Seebass, who kindly examined it for me.

CASE II.—*Uterine Fibroma:* Mrs. D., aged forty, German, married, never pregnant. Menstruated first at sixteen. Gives history of fainting spells at first three or four menstrual periods. Always flows freely, flow lasts sometimes for seven days. About a year ago she began to fail. Constipation was obstinate, and she had a peculiar affection of speech, by which she would stammer and stop in conservation. In February, 1895, I made an examination and found a tumor, reaching above the pubes,

firm, and nodular in shape; nodules could be felt through the vagina, rectum, and abdomen. I advised exploratory operation. She was admitted to St. Luke's Hospital, April 5th, and operated upon April 6, 1895. I made a small incision in median line just above the pubes, and explored, finding a firm, nodular tumor, very irregular in shape, which could only be removed by complete extirpation. I enlarged the opening almost to the umbilicus, and removed the uterus and ovaries, much as described in Case No. 1, except that the peritoneum in this case was found very friable, tearing in several places, and bleeding freely as I ligated down through the broad ligaments. When I attempted to take my flaps, I found it impossible to get one on account of the peritoneum tearing so easily; so on the posterior surface I dissected off a nodule of the tumor with the flap, thinking I could dissect it out afterward. But when I got below the nodule, the peritoneum again broke through, and I was compelled to take some cervical tissue, and make this, with the top of the vagina, serve for the posterior flap. My anterior flap I began from near the bladder, taking only peritoneum enough for my continuous suture; this, with the other flap, covered over the vaginal opening. The operation was completed as in the other case, and the after-treatment was practically the same. Patient is well and able to walk at the present time. Her speech is good. The faltering noticed before operation being scarcely noticeable since the first week after the operation.

MRS. D.—CASE II. POSTERIOR VIEW.

A—Os, with gauze in it. B—Nodule, dissected off with flap. C—Place from which nodule was taken. D—Ovary, tube, and part of broad ligament. E—Ovary, tube, and part of broad ligament. F—Nodules surrounding uterus.

CASE III.— *Diffuse infiltrating carcinoma of the cervix.* This case is one of vaginal hysterectomy. Mrs. L., aged fifty-three, English, mother of ten children; consulted me first nearly eight years ago for profuse hemorrhage, lasting sometimes for two weeks, coming on usually at regular monthly intervals. On examination, I found a fibrous polypus attached to the left side of the uterus, just within the internal os, by a pedicle. I removed it January 21, 1888, with complete cessation of hemorrhage. The patient was well until about six months ago,

MRS. L.—CASE III. POSTERIOR AND LEFT LATERAL VIEW.

A—Tumor taken seven years ago. B—Site of carcinoma. C—Nodule on posterior part of uterus. D—Fundus of uterus.

when she began to flow irregularly, not very profusely at first. She grew worse until about two months ago, when I was consulted. On examination, I found the uterus somewhat above the normal size and quite sensitive. The appearance of the cervix led me to suspect malignant disease, and I took a specimen for examination. Dr. Axtell made the examination for me and pronounced it diffuse infiltrating carcinoma. Patient was admitted to St. Luke's Hospital on the 8th of May, 1888, and operated on the following day. Preparation of the patient was the same as in the other two cases. With a sharp curette I removed all the diseased tissue I could, finding that it extended highest on the right side. After again douching out the vagina and the cavity which I had made in the cervix, I packed the cervix full of iodoform gauze, and closed it with a continuous silk suture, and again douched out the vagina with bichlorid, 1–1000. After this a continuous douch of normal salt solution was used during the operation. I freed the cervix from the vagina by a free incision anteriorly and posteriorly, entering the posterior cul-de-sac first; stitched the peritoneum to the mucous membrane by a continuous suture of sterilized catgut, and then tied off the broad ligaments with catgut, very much as when done from above. The most difficult part of the operation was in freeing the bladder from the uterus, as it was spread out and adherent over a larger space than is usual. The stumps of the broad ligaments were brought down and stitched into the vaginal opening above, thereby closing the peritoneal cavity. In doing this, the left ovary and tube came down in the way and were removed. The vagina was packed with iodoform gauze, and a dressing of iodoform gauze, iodoform and sterilized gauze, and cotton, were put over the vulva and held by the T-bandage. I removed the vaginal tampon on the fourth day, and used a bichlorid wash, 1–4000. The case ran an even course and made a good record, leaving the hospital on the twentieth day.

MEDICAL PROGRESS.

Sterilization of Catgut.—Details of the sterilization of catgut in boiling water after hardening in a solution of formalin have already been widely published. The results have not been in every instance satisfactory, and the matter receives exhaustive treatment at the hands of HOFMEISTER in the last number of the *Beiträge z. klin. Chirurgie* (vol. xvi, p. 775).

Complaints have been made that catgut so prepared kinks up in boiling, or that it loses its strength. Omitting instances in which it has been boiled in soda solution with instruments, instead of in clear water, the failures are mostly due to the fact that the catgut has not been tightly stretched on something during the boiling, or to an imperfect washing out of the formalin. The latter process requires a long time, and the odor of formalin is plainly noticeable in catgut, which is wound in several layers on a spool, even after it has been washed several hours in running water.

Hofmeister's perfected method is as follows: (1) The catgut is wound on a glass plate with slightly projecting edges, so that the gut is free from the sides of the plate and exposed to the circulation of the fluids. The ends of the gut are fastened through holes in the plate. (2) Immersion twelve to forty-eight hours in aqueous formalin two to four per cent. (3) Immersion in flowing water at least twelve hours to free the gut from the formalin. (4) Boiling in water ten to thirty minutes. Ten minutes is amply sufficient. Boiling for an hour weakens the gut somewhat. (5) Hardening and preservation in absolute alcohol containing five per cent. of glycerin and one-tenth per cent. of corrosive sublimate. After the catgut has been washed free from formalin it can be kept in alcohol and sterilized as required. It loses none of its strength—at least not in a month's time.

Experiments on animals have proved that formalin catgut is entirely absorbable, though not as quickly as the ordinary material.

THERAPEUTIC NOTES.

The Employment of Eucain in Ophthalmic Practice.—VOLLERT (*Münchener medicinische Wochenschrift*, 1896, No. 22, p. 516) reports the results of a clinical study of eucain $C_{10}H_{17}NO_4HCl$, the name given a new local anesthetic and said to possess advantages over cocain. The base itself, like cocain, is soluble in water with difficulty; while the hydrochlorate is readily soluble, crystallizing out of water in shining plates, and out of methyl-alcohol in bright prisms. The anesthetic effect is not destroyed by boiling. The salt is only partially soluble in 1–5000 sublimate solution at ordinary temperature. The precipitate is dissolved by heat to be deposited again on cooling. A five per cent. solution was employed. The conjunctival irritation, following the instillation of eucain, was more pronounced and more protracted than that due to cocain, and was renewed with each instillation. The anesthetic effect was manifested within two or three minutes, and lasted from eight to twelve minutes. Ocular tension was diminished and mydriasis and cycloparesis resulted, though perhaps not in the same degree as after the use of cocain. The injurious effects upon the epithelium of the conjunctiva and cornea were more pronounced after the use of eucain than after that of cocain.

The Best Chemical Treatment of Lupus.—DUBREUITH & BERNARK (*Monatsch. f. Prac. Dermatol.*, vol. xxii, part 3) strongly advocate early and complete excision of lupus, but for those cases where such treatment is impossible they recommend Unna's salicylic creosote plaster mull. The plaster is spread over the whole affected surface, and bandaged tightly in position. The bandage is changed daily. The lupus is destroyed while the sound skin is relatively unaffected. The resulting ulcer fills with granulation, and any yellow islets of lupus are touched with caustic. The temporary results are satisfactory, but recurrence is to be looked for. In lupus sclerosus this salicylic creosote plaster is not advised, as the scar tissue, as well as the active lupus, it destroys.

THE MEDICAL NEWS.

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OF MEDICAL SCIENCE.

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SATURDAY, OCTOBER 10, 1896.

SIR JOSEPH LISTER'S ADDRESS.

WE publish in THE NEWS of this week a very complete abstract of the presidential address of Sir Joseph Lister, before the British Association for the Advancement of Science, at its annual meeting in Liverpool, September 16th. No man of our time has been such an epoch maker, in the history of surgery, as Lister. It must have been a rare privilege to hear from the lips of this great but modest member of our profession his simple, dignified narrative of the logical steps by which he reached the final conclusion of his great theory of aseptic surgery. This is the first time that he has made known the history of his investigations, and this authoritative utterance is fraught with absorbing interest to the entire medical and surgical world. Although, in practice, we seem to have departed far from what he regarded as essential features in the system, the underlying principle of infection upon which the system was founded, is more firmly established than ever.

"Antiseptic surgery" and "antisepsis" are rapidly becoming obsolete terms, and even "asepsis" is gradually being superseded by the simple expression—surgical cleanliness. Lister believed in atmospheric infection, but we now know that practically air infection amounts to nothing, and that contact infection embraces it all. It matters little what the external surroundings may be, provided the field of operation is clean and every article that comes in contact with the wound is free from contaminating material.

Lister develops the whole subject in a masterful, entertaining, and instructive manner, and we feel confident that our readers will deem themselves fortunate in finding his address in the columns of the NEWS.

THE CIRRHOTIC DISEASES OF THE LIVER AND DIABETES.

EVER since Bernard's discoveries of the glycogenic function of the liver and the relation between irritation of the nucleus of the pneumogastric nerve and glycosuria, the attention of pathologists has been turned to the liver as a probable source of diabetes. Notwithstanding this fact careful histological studies of the liver in cases of diabetes are by no means numerous. In a very suggestive article by Dr. Pusinelli of Dresden (*Berlin. klin. Wochenschrift*, August 17, 1896), the relation between diabetes mellitus and cirrhosis of the liver is discussed, and the literature of the subject extensively quoted, while, in addition, he enriches it by the report of a case of unusual interest.

The fact that morbid changes in the liver are found in the majority of cases of diabetes is well established. For example, Glénard found them in sixty per cent. of 324 cases, and Ewald concedes their existence as a rule. The latter, however, states that in numerous cases of hepatic cirrhosis, he has neither observed glycosuria nor been able to produce it artificially by administering large quantities of grape sugar. This question then is not whether hepatic changes are present, as a rule, in cases of diabetes, but whether such changes are primary or secondary, *post hoc* or *propter hoc*. A single, carefully studied case, which throws light on this pathological problem, is a welcome contribution, and such a case is furnished by Pusinelli.

The patient was a man, forty-eight years of age, who, in 1887, first manifested signs of hepatic dis-

ease: transient icterus, with enlargement of the liver. A year later, diabetes, previously absent, was detected. This was readily amenable to treatment but, on the whole, may be said to have existed until 1893 when ascites set in.

Without entering into further details the writer would call attention to what is undoubtedly the most important clinical fact in connection with this case, viz: the diminution of the glycosuria in direct ratio with the development of the ascites, and its final disappearance when the abdomen was distended to its utmost. On the other hand, when the intra-abdominal pressure was relaxed by paracentesis the sugar reappeared. Facts, such as these, to which F. A. Hoffmann, in his "Lehrbuch der Constitutionskrankheiten," has already called attention, show the importance of repeated examinations of the urine in cases of hepatic cirrhosis.

The lesion in Pusinelli's case would have been difficult to determine from the symptoms alone. In the chronic enlargement of the liver and spleen and the icterus, it corresponded with the hypertrophic cirrhosis of Hanot and Charcot, but was differentiated by its eventually giving rise to marked ascites. Pusinelli was inclined to classify it under that subvariety of cirrhosis described by Senator as portal cirrhosis with hypertrophy, and the correctness of this view was confirmed by autopsy.

Every clinician is aware that it is impossible to classify every variety of cirrhosis under the two heads of atrophic and hypertrophic. In the opinion of the writer the best division of the cirrhotic diseases of the liver is that proposed by Senator: (1) Portal granular atrophy of the liver (atrophic cirrhosis), (*a*) portal cirrhosis with hypertrophy, (*b*) portal cirrhosis with icterus; (2) biliary cirrhosis with subsequent atrophy, (*a*) biliary cirrhosis with enlargement of spleen; (3) Hanot's hypertrophic cirrhosis with icterus.

There remains another variety of cirrhosis to which attention was first called by Hanot and Chauffard in 1881—the so-called pigmentary cirrhosis which, when combined with diabetes and melanoderma, constitutes a distinct clinical species now universally recognized under the title of *diabète bronzé*. It presents the usual features of cirrhosis, the connective tissue being most abundant around the intralobular veins, with, in addition, marked pigmentation of the cells of the hepatic parenchyma, the interstitial connective tissue and the derma.

From the foregoing it appears evident that the diagnosis of a case of hepatic cirrhosis, as atrophic or hypertrophic, should not be regarded as final, and also that a fruitful field, both of clinical and pathological research, is afforded in the obscure relation between diabetes and morbid changes in the liver.

THE NEW YORK CHARITIES COMMISSIONERS AGAIN.

FROM week to week we have chronicled in the columns of the MEDICAL News the progress of the Commissioners of Charities of New York City in endeavoring to help along the cause of quackery and to place it on a firm foundation in the public hospitals under their jurisdiction. In our issues of June 27th and July 12th, particularly, we showed how a stock company, organized for the sale of a secret remedy for drunkenness, had, through its organizer, chief stockholder, and prime mover, succeeded in hoodwinking the Commissioners to such an extent that they granted to him privileges for experimentation on the helpless poor, that had never before been dreamed of by the most aggressive and aspiring charlatan. Unfortunately, for the sake of their reputations, the Commissioners were not wise in the selection of a concoction for their "trial heat" in experimental quackery, for the monster which they tried to rear up on the pabulum of their official patronage languished, by reason of the exposure in the NEWS, and died of exhaustion nearly one month before the following resolution was put on file:

NEW YORK, September 11, 1896.

RESOLVED, That the resolution of this Board dated May 19, 1896, and subsequent resolutions providing facilities for and setting aside Ward 33 at Bellevue Hospital to be used in the treatment of alcoholism by Dr. I. Oppenheimer, are hereby rescinded. Further action in this matter is suspended, awaiting the receipt of a report on the results of Dr. Oppenheimer's treatment, such report now being in preparation by Commissioner O'Beirne. (Signed) S. C. CROFT,
JOHN P. FAURE,
JAS. R. O'BEIRNE.

The promoter of the scheme, however, had realized his ambition—plenty of free advertising—and his lack of interest in it during its dying days in the hospital was in marked contrast to the ludicrous efforts of the Commissioners to bolster it up sufficiently to get a "last word" from it, which they might hold up to their critics. But, as we warned them at the very outset, they had given the influence and weight of their official position to one of the rankest exuberations of quackery which we have recently seen. They, however, would not be advised, and preferred to flounder around in the nest which they had befouled.

The conclusion of the above resolution is in entire keeping with the straightforwardness (?) of the Commissioners in this matter heretofore. Transformed into frank Anglo-Saxon, however, it means: "Our attempts to mind the business of others have been colossal failures. We dislike to admit it, however, and are not yet ready to do so. In the meantime, we shall hide our heads, ostrich-like, under the wing of Commissioner O'Beirne, he having been largely instrumental in manipulating the practical workings of our little scheme to reform mankind, and at the same time fill the coffers of a certain doctor, who has forgotten his Hippocratic oath."

We, however, have the body of the ostrich in full sight, where a fitting castigation can be administered, but meantime we shall await "the report," which will probably never see the light.

ECHOES AND NEWS.

Tuberculous Cows.—Nearly fifty per cent. of San Francisco dairy cows will have to be slaughtered to stamp out tuberculosis, which is making great havoc among them.

A Tri-State Medical Society Meeting.—The next meeting of the Tri-State Medical Society of Alabama, Georgia, and Tennessee, will be held in Chattanooga, October 13th, 14th, and 15th.

A New College Building Opened.—The new medical college building of Syracuse University was formally opened October 5th. Dr. Stephen Smith of New York, delivered the address.

An Ether Drunkard.—A shoe-laster, who is a medical graduate, is reported by a Cincinnati paper to be in the habit of using about a quart of sulphuric ether a day, sometimes drinking it and at other times inhaling it.

Depilated by the X-ray.—A Wisconsin man was recently examined at the physical laboratory of the Minnesota State University to have the location of a bullet in his skull determined by the X-ray. On the right side of the head, which had been most exposed to the rays, the hair has all fallen out.

Hydrostatic Abdominal Exploration.—M. Marc Sée, in a communication to the Académie de Médecine, recommends submergence in water for abdominal exploration. The abdominal walls, loaded with fatty matter, tend to come to the surface of the water, thus rendering easy the delimitation of the organs beneath by palpation.

A Threadworm in the Appendix.—Dr. H. T. Williams, of Rochester (N. Y.), in the *Buffalo Medical Journal*, reports a case of appendicitis in which he had operated. In the extreme end of the appendix, surrounded with pus and liquid feces, was found a living female threadworm (*Oxyuris vermicularis*), about three-eighths of an inch in length.

Tuberculosis in the French Army.—As the result of an investigation into the prevalence of tuberculosis in the French army, GRANJUX (*Revue de la Tuberculose*, 1896, No. 2, p. 87) has found that seven men out of every thousand are affected—a proportion higher than prevails in civil life among individuals of corresponding age. The number is about the same in all European armies, but is increasing from year to year. The increase goes hand in hand with the proportion of young recruits and the necessity for training them in the shortest time possible. Tuberculosis in the army is maintained by the entrance into the ranks of those predisposed to the disease and by contagion. To reduce the danger from contagion to the minimum, it is necessary to cleanse and disinfect the barracks periodically, provide cuspidors, control the food-supply, prevent the abuse of alcohol, and avoid physical excesses.

Medical (!) Items in the Lay Press.—Under the above caption, the *Lancet* says: "If we were to reproduce all the curious medical information supplied by the lay press, there would be little room left in our pages for anything else; but the following gem, being short, as well as brilliant, we are tempted to make an exception in its favor: 'A Delicate Surgical Operation.—An eminent German oculist, Professor Deutschman, according to a medical paper, has succeeded in curing blindness by injecting the liquid of a rabbit's eye into the vitreous humor of the human eye. This is considered the most delicate surgical operation ever performed.' The following paragraph has a more serious import. The journal from which it was taken has an enormous circulation, and the distorted remarks ascribed to Professor Ray Lankester may do a vast amount of harm: 'Filtered Water is a Mistake! We live and learn! Professor Ray Lankester made some remarks recently about drinking-water at the Royal Institute. He told his hearers that if they wanted to dodge cholera and typhoid, and such like unpleasant things, they had better imbibe good rich Thames water, neither boiled nor filtered. River-water of that kind, he said, is safer to drink, for the very reason that it is teeming

with microbes of various species, which prey upon each other, and so give the human organism a chance, whereas in pure spring- or lake-water the typhoid germ, for example, flourishes unmolested by the harmless bacteria, whose function is that of killing disease-germs, so that typhoid has a clear field.' " Ridiculous enough, it is true, but hardly to be compared with the excerpts that might be made from the Sunday editions of a few of the New York papers.

The Jubilee of Anesthesia.—The commemoration of the fiftieth anniversary of the first public demonstration of surgical anesthesia will be held at the Massachusetts General Hospital, Boston, October 16, 1896. The guests will be received in the old amphitheater of the hospital, which will be restored, as far as possible, to its condition at the time of the first operation under ether by Dr. John C. Warren. The following is a program of the public exercises, which will be held in the new amphitheater: Address of welcome, by Charles H. Dalton, president of the hospital; "Reminiscences of 1846," by Dr. R. T. Davis of Fall River, and Dr. Washington Ayer of San Francisco; "Surgery before Anesthesia," by Dr. John Ashhurst, Jr., of Philadelphia; "What Anesthesia has Done for Surgery," by Dr. David W. Cheever of Boston; "Relation of Anesthesia and Obstetrics," by Dr. John P. Reynolds of Boston; "The Influence of Anesthesia upon Medical Science," by Dr. W. H. Welch of Baltimore; "The Surgery of the Future," by Dr. Charles McBurney of New York; "The Birth and Death of Pain" (a poem), by Dr. S. Weir Mitchell of Philadelphia.

British Association Gleanings.—The British Association, which, at its annual meetings, formerly afforded a platform for the first announcement of important scientific discoveries, now rather summarizes the progress of human knowledge during the year. The following are culled from the subjects presented to the Association: Professor Ramsay described the division of helium into two portions, one of which is lighter than the other, though both give the same spectrum. Dr. Dawson Turner of Edinburgh reported the results of some experiments to obtain a form of radiation from glow-worms. He confined them in vessels over sensitive photographic plates, carefully protected from ordinary light by being wrapped tightly in paper. He had great difficulty in getting the insects to glow. The photographic plate was affected, and he thought the glow-worms, even when not visibly glowing, were able to give off rays similar to the X-ray, and capable of penetrating black paper. Dr. McKendrick of Glasgow, in a paper on the phonograph, showed that the hands, when placed in troughs containing salt water, through which an electrical current from the phonograph was passing, received a rhythmical stimulation. He thought that by a proper development of these vibrations deaf persons would thus be enabled to enjoy at least the rhythm of music. Dr. W. Marat showed that respiration in cycling was easier than in walking. Professor Lorrain Smith read a paper written jointly by himself and Professor F. F. Westbrook, on fever in mice. In infected mice there was never obtained any increase in the excretion of nitrogen sufficient to warrant the inference that the metabolism had been disturbed. Supplied with dry biscuit as food, the amount of nitrogen consumed per kilogram was about twenty times as great as that of man. Dr. J. L. Bunch read a paper on the nerves of the intestines, and the effects of small doses of nicotin upon them, in which he showed that if means were taken to eliminate its action on the heart, stimulation of the peripheral cut end of the vagus was found not to influence the intestinal movements, and that intravenous injections of small doses of nicotin put the nerve-roots out of action before the splanchnics. Dr. Pavy, in a paper on the glucosid constitution of the proteid, referred to his "Physiology of the Carbohydrates," in which he had adduced evidence to show that proteid matter, whether animal or vegetable, was a glucosid. By the agency of potash, the amylose carbohydrate, corresponding with Lanchvaro's animal gum, was obtained from a number of animal and vegetable proteids. Treating this with sulphuric acid, sugar was obtained.

SPECIAL ARTICLE.

SIR JOSEPH LISTER'S PRESIDENTIAL ADDRESS BEFORE THE BRITISH ASSOCIATION.[1]

THE presidential address, always noteworthy, of the British Association for the Advancement of Science, has a special interest for the medical profession this year, as it was delivered by Sir Joseph Lister, who spoke upon the interdependence of science and the healing art.

THE RÖNTGEN RAYS.

"The surgeon never performs an operation without the aid of anatomy and physiology; and in what is often the most difficult part of his duty, the selection of the right course to follow, he, like the physician, is guided by pathology, the science of the nature of disease, which, though very difficult from the complexity of its subject-matter, has made during the last half-century, astonishing progress, so that the practice of medicine, in every department, is becoming more and more based on science as distinguished from empiricism. I propose, on the present occasion, to bring before you some illustrations of the interdependence of science and the healing art; and the first that I will take is perhaps the most astonishing of all results of purely physical inquiry—the discovery of the Röntgen rays, so-called after the man who first clearly revealed them to the world. Mysterious as they still are, there is one of their properties which we can all appreciate—their power of passing through substances opaque to ordinary light. There seems to be no relation whatever between transparency in the common sense of the term and penetrability to these emanations. The glasses of a pair of spectacles may arrest them, while a wooden and leathern case allows them to pass almost unchecked; yet they produce, whether directly or indirectly, the same effects as light upon a photographic plate. As a general rule, the denser any object is, the greater obstacle does it

[1] Delivered before the British Association for the Advancement of Science, Liverpool, September 16, 1896.

oppose to the rays. Hence as bone is denser than flesh, if the hand or other part of the body is placed above the sensitive film enclosed in a case of wood or other light material at a suitable distance from the source of the rays, while they pass with the utmost facility through the uncovered parts of the lid of the box and powerfully affect the plate beneath, they are arrested to a large extent by the bones, so that the plate is little acted upon in the parts opposite to them, while the portions corresponding to the muscles and other soft parts are influenced in an intermediate degree. Thus, a picture is obtained in which the bones stand out in sharp relief among the flesh, and anything abnormal in their shape or position is clearly displayed.

"I need hardly point out what important aid this must give to the surgeon. As an instance, I may mention a case which occurred in the practice of Mr. Howard Marsh. He was called to see a severe injury of the elbow, in which the swelling was so great as to make it impossible for him, by ordinary means of examination, to decide whether he had to deal with a fracture or dislocation. If it were the latter, a cure would be effected by the exercise of violence, which would be not only useless, but most injurious, if a bone was broken. By the aid of the Röntgen rays a photograph was taken, in which the bone of the upper arm was clearly seen displaced forward on those of the forearm. The diagnosis being thus established, Mr. Marsh proceeded to reduce the dislocation; and his success was proved by another photograph, which showed the bones in their natural relative position.

"The common metals, such as lead, iron, and copper, being still denser than the osseous structures, these rays can show a bullet imbedded in a bone or a needle lodged about a joint. At the last conversazione of the Royal Society, a picture produced by the new photography displayed with perfect distinctness through the bony framework of the chest a halfpenny low down in a boy's gullet. It had been there for six months, causing uneasiness at the pit of the stomach during swallowing; but whether the coin really remained impacted, or, if so, what was its position, was entirely uncertain till the Röntgen rays revealed it. Dr. Macintyre of Glasgow, who was the photographer, informs me that when the presence of the halfpenny had been thus demonstrated, the surgeon in charge of the case made an attempt to extract it, and although this was not successful in its immediate object, it had the effect of dislodging the coin, for a subsequent photograph by Dr. Macintyre not only showed that it had disappeared from the gullet, but also, thanks to the wonderful penetrating power which the rays had acquired in his hands, proved that it had not lodged further down in the alimentary passage. The boy has since completely recovered.

"The Röntgen rays cause certain chemical compounds to fluoresce and emit a faint light, plainly visible in the dark; and if they are made to fall upon a translucent screen impregnated with such a salt, it becomes beautifully illuminated. If a part of the human body is interposed between the screen and the source of the rays, the bones and other structures are thrown in shadow upon it, and thus a diagnosis can be made without the delay involved in taking a photograph. It was, in fact, in this way, that Dr. Macintyre first detected the coin in the boy's gullet. Mr. Herbert Jackson of King's College, London, early distinguished himself in this branch of the subject. There is no reason to suppose that the limits of the capabilities of the rays in this way have yet been reached. By virtue of the greater density of the heart than the adjacent lungs, with their contained air, the form and dimensions of that organ in the living body may be displayed on the fluorescent screen, and even its movements have been lately seen by several different observers.

"Such important applications of the new rays to medical practice have strongly attracted the interest of the public to them, and I venture to think that they have even served to stimulate the investigations of physicists. The eminent Professor of Physics in the University College of this city (Professor Lodge) was one of the first to make such practical applications, and I was able to show to the Royal Society at a very early period a photograph, which he had the kindness to send me, of a bullet imbedded in the hand. His interest in the medical aspect of the subject remains unabated, and at the same time he has been one of the most distinguished investigators of its purely physical side.

"There is another way in which the Röntgen rays connect themselves with physiology, and may possibly influence medicine. It is found that if the skin is long exposed to their action, it becomes very much irritated—affected with a sort of aggravated sunburning. This suggests the idea that the transmission of the rays through the human body may be not altogether a matter of indifference to internal organs, but may, by long-continued action, produce, according to the condition of the part concerned, injurious irritation of salutary stimulation.

ANESTHESIA IN SURGERY.

"This is the jubilee of anesthesia in surgery. That priceless blessing to mankind came from America. It had, indeed, been foreshadowed in the first year of this century by Humphry Davy, who, having found a toothache from which he was suffering relieved as he inhaled laughing gas (nitrous oxid), threw out the suggestion that it might perhaps be used for preventing pain in surgical operations. But it was not till, on September 30, 1846, Dr. W. T. G. Morton of Boston, after a series of experiments upon himself and the lower animals, extracted a tooth painlessly from a patient whom he had caused to inhale the vapor of sulphuric ether, that the idea was fully realized. He soon afterward publicly exhibited his method at the Massachusetts General Hospital, and after that event the great discovery spread rapidly over the civilized world. I witnessed the first operation in England under ether. It was performed by Robert Liston in University College Hospital, and it was a complete success. Soon afterward I saw the same great surgeon amputate the thigh as painlessly, with less complicated anesthetic apparatus, by aid of another agent, chloroform, which was being powerfully advocated as a substitute for ether by Dr. (afterward Sir James Y.) Simpson, who also had the great merit of showing that confinements could be conducted painlessly, yet safely, under its influence. These

two agents still hold the field as general anæsthetics for protracted operations, although the gas originally suggested by Davy, in consequence of its rapid action, and other advantages, has taken their place in short operations, such as tooth-extraction. In the birthplace of anesthesia ether has always maintained its ground; but in Europe it was, to a large extent, displaced by chloroform till recently, when many have returned to ether, under the idea that, though less convenient, it is safer. For my own part, I believe that chloroform, if carefully administered on right principles, is, on the average, the safer agent of the two. The discovery of anesthesia inaugurated a new era in surgery. Not only was the pain of operations abolished, but the serious, and sometimes mortal, shock which they occasioned to the system was averted, while the patient was saved the terrible ordeal of preparing to endure them. At the same time the field of surgery became widely extended, since many procedures in themselves desirable, but, before, impossible from the protracted agony they would occasion, became matters of routine practice. Nor have I by any means exhausted the list of the benefits conferred by this discovery. Anesthesia in surgery has been, from the first to last, a gift of science. Nitrous oxid, sulphuric ether, and chloroform are all artificial products of chemistry; their employment as anesthetics was the result of scientific investigation, and their administration, far from being, like the giving of a dose of medicine, a matter of rule of thumb, imperatively demands the vigilant exercise of physiological and pathological knowledge. While rendering such signal service to surgery, anesthetics have thrown light upon biology generally. It has been found that they exert their soporific influence not only upon vertebrata, but upon animals so remote in structure from man as bees and other insects. Even the functions of vegetables are suspended by their agency. They thus afford strong confirmation of the great generalization that living matter is of the same essential nature wherever it is met with on this planet, whether in the animal or vegetable kingdom. Anesthetics have also, in ways to which I need not here refer, powerfully promoted the progress of physiology and pathology."

He then described the researches on fermentation, whereby Pasteur demonstrated that the breaking up of the sugar into alcohol and carbonic acid was due to the growth of a microörganism, and the experiments of the same investigator to prove the fallacy of spontaneous generation.

THE INTRODUCTION OF ANTISEPSIS.

"Pasteur pointed out the enormous importance of these humble organisms in the economy of nature. It is by their agency that the dead bodies of plants and animals are resolved into simpler compounds fitted for assimilation by new living forms. Without their aid the world would be, as Pasteur expresses it, *encombré de cadavres*. They are essential, not only to our well-being, but to our very existence. Similar microbes must have discharged the same necessary function of removing refuse and providing food for successive generations of plants and animals during the past periods of the world's history; and it is interesting to think that organisms as simple as can well be conceived to have existed when life first appeared upon our globe have, in all probability, propagated the same lowly, but most useful offspring during the ages of geological time.

"Pasteur's labors on fermentation have had a very important influence upon surgery. I have been often asked to speak on my share in this matter before a public audience, but I have hitherto refused to do so, partly because the details are so entirely technical, but chiefly because I have felt an invincible repugnance to what might seem to savor of self-advertisement. The latter objection now no longer exists, since advancing years have indicated that it is right for me to leave to younger men the practice of my dearly loved profession. And it will perhaps be expected that, if I can make myself intelligible, I should say something upon the subject on the present occasion.

"Nothing was formerly more striking in surgical experience than the difference in the behavior of injuries according to whether the skin was implicated or not. Thus, if the bones of the leg were broken and the skin remained intact, the surgeon applied the necessary apparatus without any other anxiety than that of maintaining a good position of the fragments, although the internal injury to the bones and soft parts might be very severe. If, on the other hand, a wound of the skin was present, communicating with the broken bones, although the damage might be in other respects comparatively slight, the compound fracture, as it was termed, was one of the most dangerous accidents that could happen. Mr. Syme, who was, I believe, the safest surgeon of his time, once told me that he was inclined to think that it would be, on the whole, better if all compound fractures of the leg were subjected to amputation, without any attempt to save the limb. What was the cause of this astonishing difference? It was clearly, in some way, due to the exposure of the injured parts to the external world. One obvious effect of such exposure was indicated by the odor of the discharge, which showed that the blood in the wound had undergone putrefactive change, by which the bland nutrient liquid had been converted into highly irritating and poisonous substances. I have seen a man with compound fracture of the leg die within two days of the accident, as plainly poisoned by the products of putrefaction as if he had taken a fatal dose of some potent toxic drug.

"An external wound of the soft parts might be healed in one of two ways. If its surfaces were clean-cut and could be brought into accurate apposition, it might unite rapidly and painlessly 'by the first intention.' This, however, was exceptional. Too often the surgeon's efforts to obtain primary union were frustrated; the wound inflamed and the retentive stitches had to be removed, allowing it to gape, and then, as if it had been left open from the first, healing had to be effected in the other way, which it is necessary for me briefly to describe. An exposed raw surface became covered in the first instance with a layer of clotted blood or certain of its constituents, which invariably putrefied; and the irritation of the sensitive tissues by the putrid products appeared to me to account sufficiently for the inflammation which always occurred in and

around an open wound during the three or four days which elapsed before what were termed 'granulations' had been produced. These constituted a coarsely granular coating of very imperfect or embryonic structure, destitute of sensory nerves and prone to throw off matter or pus, rather than absorb, as freshly divided tissues do, the products of putrefaction. The granulations thus formed a beautiful living plaster, which protected the sensitive parts beneath from irritation and the system generally from poisoning and consequent febrile disturbance. The granulations had other useful properties, of which I may mention their tendency to shrink as they grew, thus gradu-reducing the dimensions of the sore. Meanwhile, another cause of its diminution was in operation. The cells of the epidermis, or scarfskin of the cutaneous margins, were perpetually producing a small crop of young cells of similar nature, which gradually spread over the granulations till they covered them entirely, and a complete cicatrix or scar was the result. Such was the other mode of healing that, by granulation and cicatrization, a process which, when it proceeded unchecked to its completion, commanded our profound admiration. It was, however, essentially tedious, compared with primary union, while, as we have seen, it was always preceded by more or less inflammation and fever, sometimes very serious in their effects. It was also liable to unforseen interruptions; the sore might become larger, instead of smaller, cicatrization giving place to ulceration in one of its various forms, or even to the frightful destruction of tissue which, from the circumstance that it was most frequently met with in hospitals, was termed hospital gangrene. Other serious, and often fatal, complications might arise, which the surgeon could only regard as untoward accidents, and over which he had no efficient control.

"It will be readily understood from the above description that the inflammation which so often frustrated the surgeon's endeavors after primary union was, in my opinion, essentially due to decomposition of blood within the wound.

"These and many other considerations had long impressed me with the greatness of the evil of putrefaction in surgery. I had done my best to mitigate it by scrupulous ordinary cleanliness and the use of various deodorant lotions. But to prevent it altogether appeared hopeless, while we believed with Liebig that its primary cause was the atmospheric oxygen which, in accordance with the researches of Graham, could not fail to be perpetually diffused through the porous dressings which were used to absorb the blood discharged from the wound. But when Pasteur had shown that putrefaction was a fermentation caused by the growth of microbes, and that these could not arise *de novo* in the decomposable substance, the problem assumed a more hopeful aspect. If the wound could be treated with some substance which, without doing too serious mischief to the human tissues, would kill the microbes already contained in it, and prevent the future access of others in the living state, putrefaction might be prevented, however freely the air with its oxygen might enter. I had heard of carbolic acid as having a remarkable deodorizing effect upon sewage, and having obtained from my colleague, Dr. Anderson, Professor of Chemistry in the University of Glasgow, a sample which he had of this product, then little more than a chemical curiosity in Scotland, I determined to try it in compound fractures. Applying it undiluted to the wound, with an arrangement for its occasional renewal, I had the joy of seeing these formidable injuries follow the same safe and tranquil course as simple fractures, in which the skin remains unbroken.

"At the same time we had the intense interest of observing in open wounds what had previously been hidden from human view—the manner in which subcutaneous injuries are repaired. Of special interest was the process by which portions of tissue killed by the violence of the accident were disposed of, as contrasted with what had till then been invariably witnessed. Dead parts had been always seen to be gradually separated from the living by an inflammatory process and thrown off as sloughs. But when protected by the antiseptic dressing from becoming putrid, and therefore irritating, a structure deprived of its life, caused no disturbance in its vicinity; and on the contrary, being of a nutritious nature, it served as pabulum for the growing elements of the neighboring living structures, and these became in due time entirely substituted for it. Even dead bone was seen to be thus replaced by living osseous tissue. This suggested the idea of using threads of dead animal tissue for tying blood vessels; and this was realized by means of catgut, which is made from the intestine of the sheep. If deprived of living microbes, and otherwise properly prepared, catgut answers its purpose completely; the knot holding securely, while the ligature around the vessel becomes gradually absorbed and replaced by a ring of living tissue. The threads, instead of being left long, as before, could now be cut short, and the tedious process of separation of the ligature, with its attendant serious danger of bleeding, was avoided.

"Undiluted carbolic acid is a powerful caustic; and although it might be employed in compound fracture, where some loss of tissue was of little moment in comparison with the tremendous danger to be averted, it was altogether unsuitable for wounds made by the surgeon. It soon appeared, however, that the acid would answer the purpose aimed at, though used in diluted forms devoid of caustic action, and, therefore, applicable to operative surgery. According to our then existing knowledge, two essential points had to be aimed at: to conduct the operation so that on its completion the wound should contain no living microbes; and to apply a dressing capable of preventing the access of other living organisms till the time should have arrived for changing it. Carbolic acid lent itself well to both these objects. Our experience with this agent brought out what was, I believe, a new principle in pharmacology—namely, that the energy of action of any substance upon the human tissues depends not only upon the proportion in which it is contained in the material used as a vehicle for its administration, but also upon the degree of tenacity with which it is held by its solvent. Water dissolves carbolic acid sparingly and holds it extremely lightly, leaving it free to act energetically on other things for which it has greater affinity, while

various organic substances absorb it greedily and hold it tenaciously. Hence its watery solution seemed admirably suited for a detergent lotion to be used during the operation, for destroying any microbes that might fall upon the wound, and for purifying the surrounding skin, and also the surgeon's hands and instruments. For the last-named purpose it had the further advantage that it did not act on steel.

"For an external dressing the watery solution was not adapted, as it soon lost the acid it contained, and was irritating while it lasted. For this purpose some organic substances were found to answer well. Large proportions of the acid could be blended with them in so bland a form as to be unirritating; and such mixtures, while perpetually giving off enough of the volatile salt to prevent organic development in the discharges that flowed past them, served as a reliable store of the antiseptic for days together.

"The appliances which I first used for carrying out the antiseptic principle were both rude and needlessly complicated. The years that have since passed have witnessed great improvements in both respects. Of the various materials which have been employed by myself and others, and their modes of application, I need say nothing except to express my belief, as a matter of long experience, that carbolic acid, by virtue of its powerful affinity for the epidermis and oily matters associated with it, and also its great penetrating power, is still the best agent at our disposal for purifying the skin around the wound. But I must say a few words regarding a most important simplification of our procedure. Pasteur, as we have seen, had shown that the air of every inhabited room teems with microbes; and for a long time I employed various more or less elaborate precautions against the living atmospheric dust, not doubting that, as all wounds except the few which healed completely by the first intention underwent putrefactive fermentation, the blood must be a peculiarly favorable soil for the growth of putrefactive microbes. But I afterward learned that such was by no means the case. I had performed many experiments in confirmation of Pasteur's germ-theory, not indeed in order to satisfy myself of its truth, but in the hope of convincing others. I had observed that uncontaminated milk, which would remain unaltered for an indefinite time if protected from dust, was made to teem with microbes of different kinds by a very brief exposure to the atmosphere, and that the same effect was produced by the addition of a drop of ordinary water. But when I came to experiment with blood drawn with antiseptic precautions into sterilized vessels, I saw, to my surprise, that it might remain free from microbes, in spite of similar access of air or treatment with water. I even found that if very putrid blood was largely diluted with sterilized water, so as to diffuse its microbes widely and wash them of their acrid products, a drop of such dilution added to pure blood might leave it unchanged for days at the temperature of the body, although a trace of the septic liquid undiluted caused intense putrefaction within twenty-four hours. Hence I was led to conclude that it was the grosser forms of septic mischief, rather than microbes in the attenuated condition in which they existed in the atmosphere, that we had to dread in surgical practice. And at the London Medical Congress, in 1881, I hinted, when describing the experiments I have alluded to, that it might turn out possible to disregard altogether the atmospheric dust. But greatly as I should have rejoiced at such a simplification of our procedure, if justifiable, I did not then venture to test it in practice. I knew that with the safeguards which we then employed I could insure the safety of my patients, and I did not dare to imperil it by relaxing them. There is one golden rule for all experiments upon our fellow men. Let the thing tried be that which, according to our best judgment, is the most likely to promote the welfare of the patient. In other words, do as you would be done by.

"Nine years later, however, at the Berlin Congress, in 1890, I was able to bring forward what was, I believe, absolute demonstration of the harmlessness of the atmospheric dust in surgical operations. This conclusion has been justified by subsequent experience; the irritation of the wound by antiseptic irrigation and washing may therefore now be avoided, and nature left undisturbed to carry out her best methods of repair, while the surgeon may conduct his operations as simply as in former days, provided always that, deeply impressed with the tremendous importance of his object, and inspiring the same conviction in all his assistants, he vigilantly maintains from first to last, with care that, once learned, becomes instinctive, but for the want of which nothing else can compensate, the use of the simple means which will suffice to exclude from the wound the coarser forms of septic impurity.

"Even our earlier and ruder methods of carrying out the antiseptic principle soon produced a wonderful change in my surgical wards in the Glasgow Royal Infirmary, which, from being some of the most unhealthy in the kingdom, became, as I believe I may say without exaggeration, the healthiest in the world; while other wards, separated from mine only by a passage a few feet broad, where former modes of treatment were for a while continued, retained their former insalubrity. This result, I need hardly remark, was not in any degree due to special skill on my part, but simply to the strenuous endeavor to carry out strictly what seemed to me a principle of supreme importance.

"Equally striking changes were afterward witnessed in other institutions. Of these I may give one example. In the great Allgemeines Krankenhaus, of Munich, hospital gangrene had become more and more rife from year to year, till at length the frightful condition was reached that eighty per cent. of all wounds became affected by it. It is only just to the memory of Professor von Nussbaum, then the head of the establishment, to say that he had done his utmost to check this frightful scourge; and that the evil was not caused by anything peculiar in his management, was shown by the fact that in a private hospital under his care there was no unusual unhealthiness. The larger institution seemed to have become hopelessly infected, and the city authorities were contemplating its demolition and reconstruction. Under these circumstances, Professor von Nussbaum dispatched his chief assistant, Dr.

Lindpaintner, to Edinburgh, where I at that time occupied the chair of clinical surgery, to learn the details of the antiseptic system as we then practised it. He remained until he had entirely mastered them, and after his return all the cases were on a certain day dressed on our plan. From that day forward not a single case of hospital gangrene occurred in the Krankenhaus. The fearful disease pyemia likewise disappeared, and erysipelas soon followed its example.

"But it was by no means only in removing the unhealthiness of hospitals that the antiseptic system showed its benefits. Inflammation being suppressed, with attendant pain, fever, and wasting discharge, the sufferings of the patient were, of course, immensely lessened; rapid primary union being now the rule, convalescence was correspondingly curtailed; while as regards safety and the essential nature of the mode of repair, it became a matter of indifference whether the wound had clean-cut surfaces which could be closely approximated, or whether the injury inflicted had been such as to cause destruction of tissue. And operations which had been regarded from time immemorial as unjustifiable were adopted with complete safety.

"It pleases me to think that there is an ever-increasing number of practitioners throughout the world to whom this will not appear the language of exaggeration. There are cases in which, from the situation of the part concerned or other unusual circumstances, it is impossible to carry out the antiseptic system completely. These, however, are quite exceptional; and even in them much has been done to mitigate the evil which cannot be altogether avoided.

"I ask your indulgence if I have seemed to dwell too long upon matters in which I have been personally concerned. I now gladly return to the labors of others.

BACTERIA THE CAUSE OF DISEASE.

"The striking results of the application of the germ-theory to surgery, acted as a powerful stimulus to the investigation of the nature of the microörganisms concerned; and it soon appeared that putrefaction was by no means the only evil of microbic origin to which wounds were liable. I had myself very early noticed that hospital gangrene was not necessarily attended by any unpleasant odor; and I afterward made a similar observation regarding the matter formed in a remarkable epidemic of erysipelas in Edinburgh, obviously of infective character. I had also seen a careless dressing followed by the occurrence of suppuration without putrefaction. And as these non-putrefactive disorders had the same self-propagating property as ferments, and were suppressed by the same antiseptic agencies which were used for combating the putrefactive microbes, I did not doubt that they were of an analogous origin; and I ventured to express the view that, just as the various fermentations had each its special microbe, so it might be with the various complications of wounds. This surmise was afterward amply verified. Professor Ogston of Aberdeen, was an early worker in this field, and showed that in acute abscesses, that is to say, those which run a rapid course, the matter, although often quite free from unpleasant odor, invariably contains microörganisms belonging to the group which, from the spherical form of their elements, are termed micrococci; and these he classed as streptococci or staphylococci, according as they were arranged in chains or disposed in irregular clusters, like bunches of grapes. The German pathologist, Fehleisen, followed with a beautiful research, by which he clearly proved that erysipelas is caused by a streptococcus. A host of earnest workers in different countries have cultivated the new science of bacteriology, and while opening up a wide fresh domain of biology, have demonstrated in so many cases the causal relation between special microörganisms and special diseases, not only in wounds, but in the system generally, as to afford ample confirmation of the induction which had been made by Pasteur, that all infective disorders are of microbic origin.

"Not that we can look forward with anything like confidence to being able to see the *materies morbi* of every disease of this nature. One of the latest of such discoveries has been that by Pfeiffer of Berlin, of the bacillus of influenza, perhaps the most minute of all microörganisms ever yet detected. The bacillus of anthrax, the cause of a plague common among cattle in some parts of Europe, and often communicated to sorters of foreign wool in this country, is a giant as compared with this tiny being; and supposing the microbe of any infectious fever to be as much smaller than the influenza bacillus as this is less than that of anthrax—a by no means unlikely hypothesis—it is probable that it would never be visible to man. The improvements of the microscope, based on the principle established by my father in the earlier part of the century, have apparently nearly reached the limits of what is possible. But that such parasites are really the causes of all this great class of diseases can no longer be doubted.

"The first rational step toward the prevention or cure of disease is to know its cause; and it is impossible to overestimate the practical value of researches, such as those to which I am now referring. Among their many achievements is what may be fairly regarded as the most important discovery ever made in pathology, because it revealed the true nature of the disease which causes more sickness and death in the human race than any other. It was made by Robert Koch, who greatly distinguished himself, when a practitioner in an obscure town in Germany, by the remarkable combination of experimental acuteness and skill, chemical and optical knowledge, and successful micro-photography which he brought to bear upon the illustration of infective diseases of wounds in the lower animals; in recognition of which service, the enlightened Prussian government at once appointed him to an official position of great importance in Berlin. There he conducted various important researches; and at the London Congress, in 1881, he showed to us, for the first time, the bacillus of tubercle. Wonderful light was thrown, by this discovery, upon a great group of diseases which had before been rather guessed than known to be of an allied nature; a precision and efficacy never before possible was introduced into their surgical treatment, while the physi-

cian became guided by new and sure light as regards their diagnosis and prevention.

"At that same London Congress, Koch demonstrated to us his 'plate culture' of bacteria, which was so important that I must devote a few words to its description. With a view to the successful study of the habits and effects of any particular microbe outside the living body, it is essential that it should be present unmixed in the medium in which it is cultivated. It can be readily understood how difficult it must have been to isolate any particular microörganism when it existed mixed, as was often the case, with a multitude of other forms. In fact, the various ingenious attempts made to effect this object had often proved entire failures. Koch, however, by an ingenious procedure, converted what had been before impossible into a matter of the utmost facility. In the broth or other nutrient liquid, which was to serve as food for the growing microbe, he dissolved, by aid of heat, just enough gelatin to insure that, while it should become a solid mass when cold, it should remain fluid, though reduced in temperature so much as to be incapable of killing living germs. To the medium thus partially cooled, was added some liquid containing, among others, the microbe to be investigated; and the mixture was thoroughly shaken so as to diffuse the bacteria and separate them from each other. Some of the liquid was then poured out in a thin layer upon a glass plate and allowed to cool so as to assume the solid form. The various microbes, fixed in the gelatin and so prevented from intermingling, proceeded to develop each its special progeny, which, in course of time, showed itself as an opaque speck in the transparent film. Any one of such specks could now be removed and transferred to another vessel in which the microbe composing it, grew in perfect isolation.

"Pasteur was present at this demonstration, and expressed his sense of the great progress effected by the new method. It was soon introduced into his own institute and other laboratories throughout the world; and it has immensely facilitated bacteriological study.

"One fruit of it in Koch's own hands was the discovery of the microbe of cholera in India, whither he went to study the disease. This organism was termed by Koch from its curved form the 'comma bacillus,' and by the French the cholera vibrio. Great doubts were for a long time felt regarding this discovery. Several other kinds of bacteria were found of the same shape, some of them producing very similar appearances in culture-media. But bacteriologists are now universally agreed that, although various other conditions are necessary to the production of an attack of cholera besides the mere presence of the vibrio, yet it is the essential *materies morbi;* and it is by the aid of the diagnosis which its presence in any case of true cholera enables the bacteriologist to make, that threatened invasions of this awful disease have of late years been so successfully repelled from our shores. If bacteriology had done nothing more for us than this, it might well have earned our gratitude.

PREVENTIVE INOCULATION.

"I have next to invite your attention to some earlier work of Pasteur. There is a disease known in France under the name of *choléra des poules*, which often produced great havoc among the poultry yards of Paris. It had been observed that the blood of birds that had died of this disease were peopled by a multitude of minute bacteria, not very dissimilar in form and size to the microbe of the lactic ferment, to which I have before referred. And Pasteur found that, if this bacterium was cultivated outside the body for a protracted period, under certain conditions, it underwent a remarkable diminution of its virulence; so that, if inoculated into a healthy fowl, it no longer caused the death of the bird, as it would have done in its original condition, but produced a milder form of the disease, which was not fatal. And this altered character of the microbe, caused by certain conditions, was found to persist in successive generations cultivated in the ordinary way. Thus was discovered the great fact, of what Pasteur termed *atténuation des virus*, which at once gave the clue to understanding what had before been quite mysterious, the difference in virulence of the same disease in different epidemics.

"But he made a further very important observation, that a bird which had gone through a mild form of the complaint had acquired immunity against it in its most virulent condition. Pasteur afterward succeeded in obtaining mitigated varieties of microbes for some other diseases; and he applied with great success the principle which he had discovered in fowl-cholera for protecting the larger domestic animals against the plague of anthrax. The preparations used for such preventive inoculations he termed 'vaccins' in honor of our great countryman, Edward Jenner. For Pasteur at once saw the analogy between the immunity to fowl-cholera, produced by its attenuated virus, and the protection afforded against smallpox by vaccination. And while pathologists still hesitated, he had no doubt of the correctness of Jenner's expression *variolæ vaccinæ*, or smallpox in the cow.

"It is just a hundred years since Jenner made the crucial experiment of inoculating with smallpox a boy whom he had previously vaccinated, the result being, as he anticipated, that the boy was quite unaffected.

"While we cannot be astonished that the centenary of Jenner's immortal discovery should have failed to receive general recognition in this country, it is melancholy to think that this year should, in his native county, have been distinguished by a terrible illustration of the results which would sooner or later inevitably follow the general neglect of his prescriptions.

"But to return to Pasteur. In 1880 he entered upon the study of that terrible, but then most obscure disease, hydrophobia or rabies, which, from its infective character, he was sure must be of microbic origin, although no microorganism could be detected in it. He early demonstrated the new pathological fact that the virus had its essential seat in the nervous system. This proved the key to his success in this subject. One result that flowed from it has been the cause of unspeakable consolation to many. The foolish practice is still too prevalent of killing the dog that has bitten any one, on the absurd notion that, if it were mad, its destruction would prevent the occurrence of

hydrophobia in the person bitten. The idea of the bare possibility of the animal having been so affected causes an agony of suspense during the long weeks or months of possible incubation of the disease. Very serious nervous symptoms aping true hydrophobia have been known to result from the terror thus inspired. Pasteur showed that if a little of the brain or spinal cord of a dog that had been really mad was inoculated in an appropriate manner into a rabbit, it infallibly caused rabies in that animal in a few days. If, therefore, such an experiment was made with a negative result, the conclusion might be drawn with certainty that the dog had been healthy. It is perhaps right that I should say that the inoculation is painlessly done under an anesthetic, and that in the rabbit rabies does not assume the violent form that it does in the dog, but produces gradual loss of power, with little, if any suffering.

"This is the more satisfactory because rabbits in which the disease has been thus artificially induced are employed in carrying out what was Pasteur's greatest triumph—the preventive treatment of hydrophobia in the human subject. We have seen that Pasteur discovered that microbes might, under some circumstances, undergo mitigation of their virulence. He afterward found that under different conditions they might have it exalted, or, as he expressed it, there might be a *renforcement du virus*. Such proved to be the case with rabies in the rabbit; so that the spinal cords of animals which had died of it contained the poison in a highly intensified condition. But he also found that if such a highly virulent cord was suspended under strict antiseptic precautions in a dry atmosphere at a certain temperature, it gradually, from day to day, lost its potency, till, in course of time, it became absolutely inert. If now the emulsion of such a harmless cord was introduced under the skin of an animal, as in the subcutaneous administration of morphia, it might be followed without harm another day by a similar dose of a cord still rather poisonous; and so from day to day stronger and stronger injections might be used, the system becoming gradually accustomed to the poison, till a degree of virulence had been reached far exceeding that of the bite of a mad dog. When this had been attained, the animal proved incapable of taking the disease in the ordinary way, and, more than that, if such treatment was adopted after an animal had already received the poison, provided that too long a time had not elapsed, the outbreak of the disease was prevented. It was only after great searching of heart that Pasteur, after consultation with some trusted medical friends, ventured upon trying this practice upon man. It has since been extensively adopted in various parts of the world with increasing success as the details of the method were improved. It is not, of course, the case that every one bitten by a really rabid animal takes the disease, but the percentage of those who do so, which was formerly large, has been reduced almost to zero by this treatment, if not too long delayed.

"While the intensity of rabies in the rabbit is undoubtedly due to a peculiarly virulent form of the microbe concerned, we cannot suppose that the daily diminishing potency of the cord suspended in dry, warm air is an instance of attenuation of virus, using the term 'virus' as synonymous with the microbe concerned. In other words, we have no reason to believe that the special microorganism of hydrophobia continues to develop in the dead cord and produce successively a milder and milder progeny, since rabies cannot be cultivated in the nervous system of a dead animal. We must rather conclude that there must be some chemical poison present which gradually toses its potency as time passes. And this leads me to refer to another most important branch of this large subject of bacteriology, that of the poisonous products of microbes.

The Antitoxin Treatment.

"It was shown several years ago by Roux and Yersin, working in the Institut Pasteur, that the crust or false membrane which forms upon the throats of patients affected with diphtheria contains bacteria, which can be cultivated outside of the body in a nutrient liquid, with the result that it acquires poisonous qualities of astonishing intensity, comparable to that of the secretion of the poison-glands of the most venomous serpents. And they also ascertained that the liquid retained this property after the microbes had been removed from it by filtration, which proved that the poison must be a chemical substance in solution, as distinguished from the living element which had produced it. These poisonous products of bacteria, or toxins, as they have been termed, explain the deadly effects of some microbes, which it would otherwise be impossible to understand. Thus, in diphtheria itself the special bacillus which was shown by Loeffler to be its cause does not become propagated in the blood, like the microbe of chicken cholera, but remains confined to the surface on which it first appeared; but the toxin which it secretes is absorbed from that surface into the blood, and so poisons the system. Similar observations have been made with regard to the microbes of some other diseases, as, for example, the bacillus of tetanus or lockjaw. This remains localized in the wound, but forms a special toxin of extreme potency, which becomes absorbed and diffused through the body.

"Wonderful as it seems, each poisonous microbe appears to form its own peculiar toxin. Koch's tuberculin was of this nature—a product of the growth of the tubercle bacillus in culture-media. Here, again, great effects were produced by extremely minute quantities of the substance, but here a new peculiarity showed itself, viz., that patients affected with tubercular disease, in any of its varied forms, exhibited inflammation in the affected part and general fever after receiving under the skin an amount of the material which had no effect whatever upon healthy persons. I witnessed in Berlin some instances of these effects, which were simply astounding. Patients affected with a peculiar form of obstinate ulcer of the face showed, after a single injection of the tuberculin, violent inflammatory redness and swelling of the sore and surrounding skin; and, what was equally surprising, when this disturbance subsided, the disease was found to have undergone great improvement. By repetitions of such procedures, ulcers which had previously been steadily advancing, in spite of ordinary treatment, became greatly

reduced in size and, in some instances, apparently cured. Such results led Koch to believe that he had obtained an effectual means of dealing with tubercular disease in all its forms. Unhappily, the apparent cure proved to be only of transient duration, and the high hopes which had been inspired by Koch's great reputation were dashed. It is but fair to say that he was strongly urged to publish before he was himself disposed to do so, and we cannot but regret that he yielded to the pressure put upon him.

"But though Koch's sanguine anticipations were not realized, it would be a great mistake to suppose that his labors with tuberculin have been fruitless. Cattle are liable to tubercle, and, when affected with it, may become a very serious source of infection for human beings, more especially when the disease affects the udder of cows, and so contaminates the milk. By virtue of the close affinity that prevails between the lower animals and ourselves, in disease as well as in health, tuberculin produces fever in tubercular cows in doses which do not affect healthy beasts. Thus, by the subcutaneous use of a little of the fluid, tubercle latent in internal organs of an apparently healthy cow can be with certainty revealed, and the slaughter of the animal after this discovery protects man from infection.

"It has been ascertained that glanders presents a precise analogy with tubercle as regards the effects of its toxic products. If the microbe which has been found to be the cause of this disease is cultivated in appropriate media it produces a poison which has received the name of mallein, and the subcutaneous injection of a suitable dose of this fluid into a glandered horse causes striking febrile symptoms which do not occur in a healthy animal. Glanders, like tubercle, may exist in insidious latent forms which there was formerly no means of detecting, but which are at once disclosed by this means. If a glandered horse has been accidentally introduced into a large stable this method of diagnosis surely tells if it has infected others. All receive a little mallein. Those which become affected with fever are slaughtered, and thus not only is the disease prevented from spreading to other horses, but the grooms are protected from a mortal disorder.

"This valuable resource sprang from Koch's work on tuberculin, which has also indirectly done good in other ways. His distinguished pupil, Behring, has expressly attributed to those researches the inspiration of the work which led him and his famous collaborator, the Japanese Kitasato, to their surprising discovery of antitoxin serum. They found that if an animal of a species liable to diphtheria or tetanus received a quantity of the respective toxin, so small as to be harmless, and afterward, at suitable intervals, successively stronger and stronger doses, the creature, in course of time, acquires such a tolerance for the poison as to be able to receive with impunity a quantity very much greater than would at the outset have proved fatal. So far we have nothing more than seems to correspond with the effects of the increasingly potent cords in Pasteur's treatment of rabies. But what was entirely new in their results was that, if blood was drawn from an animal which had acquired this high degree of artificial immunity, and some of the clear fluid or serum which exuded from it after it had clotted was introduced under the skin of another animal, this second animal acquired a strong, though more transient, immunity against the particular toxin concerned. The serum in some way counteracted the toxin or was antitoxic. But, more than that, if some of the antitoxic serum was applied to an animal after it had already received a poisonous dose of the toxin it preserved the life of the creature, provided that too long a time had not elapsed after the poison was introduced. In other words, the antitoxin proved to be not only preventive but curative.

"Similar results were afterward obtained by Ehrlich of Berlin, with some poisons not of bacterial origin, but derived from the vegetable kingdom; and quite recently the independent labors of Calmette of Lille, and Fraser of Edinburgh, have shown that antidotes of wonderful efficacy against the venom of serpents may be procured on the same principle. Calmette has obtained antitoxin so powerful that a quantity of it only a 200,000th part of the weight of an animal will protect it perfectly against a dose of the secretion of the poison-glands of the most venomous serpents known to exist, which, without such protection, would have proved fatal in four hours. For curative purposes larger quantities of the remedy are required, but cases have already been published by Calmette in which death appears to have been averted in the human subject by this treatment.

"Behring's darling object was to discover means of curing tetanus and diphtheria in man. In tetanus the conditions are not favorable; because the specific bacilli lurk in the depths of the wound, and only declare their presence by symptoms caused by their toxin having been already in a greater or less amount diffused through the system; and in every case of this disease there must be a fear that the antidote may be applied too late to be useful. But in diphtheria the bacilli very early manifest their presence by the false membrane which they cause upon the throat, so that the antitoxin has a fair chance; and here we are justified in saying that Behring's object has been attained.

"The problem, however, was by no means so simple as in the case of some mere chemical poison. However effectual the antitoxin might be against the toxin, if it left the bacilli intact, not only would repeated injections be required to maintain the transient immunity to the poison perpetually secreted by the microbes, but the bacilli might, by their growth and extension, cause obstruction of the respiratory passages.

"Roux, however, whose name must always be mentioned with honor in relation to this subject, effectually disposed of this difficulty. He showed by experiments on animals that a diphtheritic false membrane, rapidly extending and accompanied by surrounding inflammation, was brought to a stand by the use of the antitoxin, and soon dropped off, leaving a healthy surface. Whatever be the explanation, the fact was thus established that the antitoxic serum, while it renders the toxin harmless, causes the microbe to languish and disappear.

"No theoretical objection could now be urged against the

treatment; and it has during the last two years been extensively tested in practice in various parts of the world, and it has gradually made its way more and more into the confidence of the profession. One important piece of evidence in its favor in this country is derived from the report of the six large hospitals under the management of the London Asylums Board. The medical officers of these hospitals at first naturally regarded the practice with skepticism, but as it appeared to be at least harmless they gave it a trial; and during the year 1895 it was very generally employed upon the 2182 cases admitted, and they have all become convinced of its great value. In the nature of things, if the theory of the treatment is correct, the best results must be obtained when the patients are admitted at an early stage of the attack, before there has been time for much poisoning of the system, and accordingly we learn from the report that, comparing 1895 with 1894, during which latter year the ordinary treatment had been used, the percentage of mortality, in all the six hospitals combined, among the patients admitted on the first day of the disease, which in 1894 was 22.5, was only 4.6 in 1895; while for those admitted on the second day the numbers are 27 for 1894 and 14.8 for 1895. Thus, for cases admitted on the first day the mortality was only one-fifth of what it was in the previous year, and for those entering on the second it was halved. Unfortunately, in the lower part of London, which furnish most of these patients, the parents too often delay in sending in the children till much later, so that on an average no less than 67.5 per cent. were admitted on the fourth day of the disease or later. Hence the aggregate statistics of all cases are not nearly so striking. Nevertheless, taking it altogether, the mortality in 1895 was less than had ever before been experienced in these hospitals. I should add that there was no reason to think that the disease was of a milder type than usual in 1895; and no change whatever was made in the treatment except as regards the antitoxic injections.

"There is one piece of evidence recorded in the report which, though it is not concerned with high numbers, is well worthy of notice. It relates to a special institution to which convalescents from scarlet fever are sent from all the six hospitals. Such patients occasionally contract diphtheria, and when they do so the added disease has generally proved extremely fatal. In the five years preceding the introduction of the treatment with antitoxin the mortality from this cause had never been less than 50 per cent., and averaged on the whole 61.9 per cent. During 1895, under antitoxin, the deaths among the 119 patients of this class were only 7.5 per cent., or one-eighth of what had been previously experienced. This very striking result seems to be naturally explained by the fact that these patients, being already in a hospital when the diphtheria appeared, an unusually early opportunity was afforded for dealing with it.

"There are certain cases of so malignant a character from the first that no treatment will probably ever be able to cope with them. But taking all cases together, it seems probable that Behring's hope that the mortality may be reduced to five per cent. will be fully realized when the public have become alive to the paramount importance of having the treatment commenced at the outset of the disease.

"There are many able workers in the field of bacteriology whose names time does not permit me to mention, and to whose important labors I cannot refer; and even those researches of which I have spoken have been, of course, most inadequately dealt with. I feel this especially with regard to Pasteur, whose work shines out more brightly the more his writings are perused.

PHAGOCYTOSIS.

"I have lastly to bring before you a subject which, though not bacteriological, has intimate relations with bacteria. If a drop of blood is drawn from the finger by a prick with a needle and examined microscopically between two plates of glass, there are seen in it minute solid elements of two kinds, the one pale orange biconcave disks, which, seen in mass, give the red color to the vital fluid; the other, more or less granular spherical masses of the soft material called protoplasm, destitute of color, and therefore called the colorless, or white corpuscles. It has been long known that if the microscope was placed at such a distance from the fire as to have the temperature of the human body, the white corpuscles might be seen to put out and retract little processes or pseudopodia, and by their means crawl over the surface of the glass, just like the extremely low forms of animal life, termed, from this faculty of changing their form, amebæ. It was a somewhat weird spectacle, that of seeing what had just before been constituents of our own blood, moving about like independent creatures. Yet there was nothing in this inconsistent with what we know of the fixed components of the animal frame. For example, the surface of a frog's tongue is covered with a layer of cells, each of which is provided with two or more lashing filaments or cilia, and those of all the cells acting in concert cause a constant flow of liquid in a definite direction over the organ. If we gently scrape the surface of the animal's tongue we can detach some of these ciliated cells; and on examining them with the microscope in a drop of water we find that they will continue for an indefinite time their lashing movements, which are just as much living or vital in their character as the writhings of a worm. And, as I observed many years ago, these detached cells behave under the influence of a stimulus just like parts connected with the body, the movement of the cilia being excited to greater activity by gentle stimulation, and thrown into a state of temporary inactivity when the irritation was more severe. Thus each constituent element of our bodies may be regarded as in one sense an independent living being, though all work together in marvelous harmony for the good of the body politic. The independent movements of the white corpuscles outside the body were therefore not astonishing; but they long remained matters of mere curiosity. Much interest was called to them by the observation of the German pathologist Cohnheim, that in some inflammatory conditions they passed through the pores in the walls of the finest blood-vessels, and thus escaped into the inter-

stices of the surrounding tissues. Cohnheim attributed their transit to the pressure of the blood. But why it was that, though larger than the red corpuscles, and containing a nucleus which the red ones have not, they alone passed through the pores of the vessels, or why it was that this emigration of the white corpuscles occurred abundantly in some inflammations and was absent in others, was quite unexplained.

"These white corpuscles, however, have been invested with extraordinary new interest by the researches of the Russian naturalist and pathologist Metchnikoff. He observed that, after passing through the walls of the vessels, they not only crawl about like amebæ, but, like them, receive nutritious materials into their soft bodies and digest them. It is thus that the effete materials of a tadpole's tail are got rid of; so that they play a most important part in the function of absorption.

"But still more interesting observations followed. He found that a microscopic crustacean, a kind of water-flea, was liable to be infested by a fungus, which had exceedingly sharp-pointed spores. These were apt to penetrate the coats of the creature's intestine, and project into its body-cavity. No sooner did this occur with any spore than it became surrounded by a group of the cells which are contained in the cavity of the body and correspond to the white corpuscles of our blood. These proceeded to attempt to devour the spore, and if they succeeded in every such case the animal was saved from the invasion of the parasite. But if the spores were more than could be disposed of by the devouring cells (phagocytes, as Metchnikoff termed them) the water-flea succumbed.

"Starting from this fundamental observation, he ascertained that the microbes of infective diseases are subject to this same process of devouring and digestion, carried on both by the white corpuscles and by cells that line the blood-vessels. And by a long series of most beautiful researches he has, as it appears to me, firmly established the great truth that phagocytosis is the main defensive means possessed by the living body against the invasion of its microscopic foes. The power of the system to produce antitoxic substances to counteract the poisons of microbes is undoubtedly in its own place of great importance. But in the large class of cases in which animals are naturally refractory to particular infective diseases, the blood is not found to yield any antitoxic element by which the natural immunity can be accounted for. Here phagocytosis seems to be the sole defensive agency. And even in cases in which the serum does possess antitoxic, or, as it would seem in some cases, germicidal properties, the bodies of the dead microbes must at last be got rid of by phagocytosis, and some recent observations would seem to indicate that the useful elements of the serum may be, in part at least, derived from the digestive juices of the phagocytes. If ever there was a romantic chapter in pathology, it has surely been that of the story of phagocytosis.

"I was myself peculiarly interested by these observations of Metchnikoff, because they seemed to me to afford clear explanation of the healing of wounds by first intention under circumstances before incomprehensible. This primary union was sometimes seen to take place in wounds treated by water-dressing, that is to say, a piece of wet lint covered with a layer of oiled silk to keep it moist. This, though clean when applied, was invariably putrid within twenty-four hours. The layer of blood between the cut surfaces was thus exposed at the outlet of the wound to a most potent septic focus. How was it prevented from putrefying, as it would have done under such influence if, instead of being between divided living tissues, it had been between plates of glass or other indifferent material? Pasteur's observations pushed the question a step further. It now was, how were the bacteria of putrefaction kept from propagating in the decomposable film? Metchnikoff's phagocytosis supplied the answer. The blood between the lips of the wound became rapidly peopled with phagocytes, which kept guard against the putrefactive microbes, and seized them as they endeavored to enter.

"If phagocytosis was ever able to cope with septic microbes in so concentrated and intense a form, it could hardly fail to deal effectually with them in the very mitigated condition in which they are present in the air. We are thus strongly confirmed in our conclusion that the atmospheric dust may safely be disregarded in our operations, and Metchnikoff's researches, while they have illumined the whole pathology of infective diseases, have beautifully completed the theory of antiseptic treatment in surgery.

"I might have taken equally striking illustrations of my theme from other department in which microbes play no part. In fact, any attempt to speak of all that the art of healing has borrowed from science and contributed to it during the past half-century, would involve a very extensive dissertation on pathology and therapeutics. I have culled specimens from a wide field; and I only hope that in bringing them before you, I have not overstepped the bounds of what is fitting before a mixed company. For many of you, my remarks can have had little, if any, novelty; for others, they may, perhaps, possess some interest as showing that medicine is no unworthy ally of the British Association; that, while her practice is ever more and more based on science, the ceaseless efforts of her votaries to improve what have been fittingly designated *Quæ prosunt omnibus artes* are ever adding largely to the sum of abstract knowledge."

SOCIETY PROCEEDINGS.

AMERICAN PUBLIC HEALTH ASSOCIATION.

Twenty-fourth Annual Session held in Buffalo, N. Y., September 15 to 18, 1896.

THE opening session was called to order promptly at 10 o'clock by the president, DR. EDUARDO LICEAGO of Mexico, and after the reports of various committees and other executive business, the regular program was taken up.

The morning was chiefly devoted to the consideration of the problems of the disinfection and sanitation of railroad cars and steamboats, papers being read by DRS. DOMINGO, ORVAÑANOS, City of Mexico; TOMAS NO-

RIEGA, Chinpas, and FREDERICK MONTIVAMBERT of Toronto. The Mexican delegates reported some specially distressing cases of the spreading of contagion by this means, and a brisk discussion as to ways and means of guarding against this source of danger followed.

In the afternoon a group of papers upon meat and milk infections were first presented by DRS. J. F. KENNEDY of Iowa, GARDNER F. SWARTS of Rhode Island, and D. E. SALMON of Washington, D. C.

DR. KENNEDY took the ground that inasmuch as the death-rate among children fed upon cow's milk was much higher than among those suckled at the breast, and this mortality was chiefly due to two things, dilution with water causing death by inanition and infection with various germs, that a most rigid inspection and testing of milk should be insisted upon. But even this might fail, unavoidably, at the most vital point, and, therefore, to ensure absolute safety all milk used by infants should be sterilized. Infection might occur simply by washing the cans with impure water. Tuberculosis was the chief danger, but typhoid, diphtheria, and scarlet fever were also frequently spread through this medium.

DR. SWARTS urged that farms should be established near all cities similar to that in operation near Buffalo where, at the suggestion of a number of physicians, every sanitary precaution was carried out in the dairy, the milk submitted to a bacteriological examination every week, and then certified to by them as pure and suitable for children's use. A higher price (ten cents per quart) had, of course, to be charged for such milk, but this was found to be gladly paid by the more intelligent class of parents that the dairyman had no difficulty in disposing of his entire output, and is talking of increasing the number of his cows to meet the demand.

DR. SALMON'S paper was the report of the committee on

ANIMAL DISEASES AND ANIMAL FOOD.

He urged the necessity of more stringent measures against the spread of anthrax, and of rabies, and of greater legal powers in dealing with the sale of tuberculous meats.

DR. BENJAMIN LEE of Philadelphia, took issue with Dr. Kennedy as to the healthfulness of sterilized milk, which, he declared, was robbed of some of its most valuable nutritive elements, and would cause both rickets and infantile scurvy. Both of these diseases had become much more common since the introduction of the sterilized article.

DR. HIBBARD of Indiana, doubted if any cases of tuberculosis could be positively traced to contaminated milk.

DR. LYMAN of Massachusetts, intimated that the chief danger lay rather in lowered resisting power on the part of the child, and urged pure air, sunlight, and sleep as indispensible safeguards.

DR. HALTON of Vermont, thought we were giving the public exaggerated notions of the danger of tubercular infection through milk.

DR. KINYOUN and DR. SALMON, in closing, cited cases of such infection, and declared the danger in no risk of exaggeration.

Two valuable papers followed upon the nomenclature of

DISEASES AND FORMS OF STATISTICS,

by DRS. EDUARDO LICEAGA, Mexico, and SAMUEL W. ABBOT of Massachusetts, but provoked little discussion.

The evening session, after addresses of welcome by Mayor Jewett and Rev. Thos. Slicer of Buffalo, and response by Dr. Peter Bryce of Toronto, was devoted to the address of the president.

He chose for his subject the history and development of public hygiene in America in general, and in Mexico in particular.

Rapid strides had been made in the last twenty years under the administration and encouragement of President Diaz. The question of the differential study of contagious diseases as to the degree and length of isolation and quarantine in each form, and also as to actual length of time which the infection of each persisted after cure, was taken up in detail, and many valuable suggestions offered. The necessity of a broader study by uniform methods of all the problems of contagion and disinfection over wide areas of country was urged, and the necessity of government inspection and regulation of viruses and serums, for inoculation purposes, insisted upon.

WEDNESDAY, SEPTEMBER 16TH.

After some preliminary announcements and reports, the Association considered the question of the disposal of garbage. The report of the committee on this subject was read by Rudolph Hering, C.E., of New York, and papers followed by Colonel Wm. F. Morse of New York, Dr. N. E. Wordin of Connecticut, and Major Wm. S. Tremaine, U. S. A. The paper of Colonel Morse was especially interesting, and all the readers united substantially in recommending that each household should carbonize its own refuse in some way, and turn it over to the municipal authorities in the shape of ashes. Two of them recommended the use of a box and cradle, which could be attached to or inserted in the kitchen stove-pipe, and Dr. Wordin exhibited two forms of such an apparatus, one with gas-burner attachment. With this latter, it was declared that not only kitchen refuse, but even feces could be completely incinerated without any escape of gases or odors, and the larger sizes could be used in place of water-closets where hydrant-water was not available. Dr. Gihon opened the discussion of the papers with the somewhat startling remark that the best way to dispose of half of our garbage was to eat it. We prepare nearly twice as much food as can reasonably be disposed of and throw away, or permit to spoil nearly half of it. Both economy and sanitation would be promoted if we could take a leaf out the books of the French in this regard.

The discussion was continued by Drs. Sternberg, Lee, Durgin, and Lucien Howe, who, in the main, agreed with the papers that the swill-pail and the garbage-barrel were themselves nuisances, which ought to be abated as much as possible.

Two papers upon

THE TRANSPORTATION AND DISPOSAL OF THE DEAD,

by DRS. CHAS. O. PROBST of Columbus, and BENJ. LEE of Philadelphia, and a brief discussion, completed the morning session.

The afternoon was devoted chiefly to the papers upon

SANITARY ORGANIZATION AND LEGISLATION,

by health officers, and the introduction of various resolutions. These latter referred to the prevention of blindness by Credé's method, the establishment of a National Board of Health and the Pasteur monument. This last provoked a most amusing little ebullition from Dr. Gihon, who moved first that each member who contributed to the secretary $1 for the Pasteur fund, be called upon for $10 toward the Rush monument fund of lingering fame. This being declared out of order, he promptly begged to amend the original motion by simply substituting "Benjamin Rush" for "Louis Pasteur," all of which were referred to the Committee of Resolutions.

THURSDAY, SEPTEMBER 17TH.

After one or two papers and reports upon the protection of rivers and other sources of water supply, WYATT JOHNSON, M.D., of Montreal, read a most interesting paper upon

THE SERUM TEST FOR TYPHOID FEVER.

It has been known for some time that the addition of a few drops of the blood-serum of a convalescent from typhoid fever to a pure, fresh culture of Eberth's bacillus. would produce a decided effect upon the organisms. It is now found that the blood of cases in comparatively early stages of the disease has the same power, and Dr. Johnson discovered that it still retains this potency even when dried, so that a drop of serum pressed out and allowed to dry upon a visiting card or scrap of paper can furnish a valuable diagnostic test. Specimens of cultures to which dried typhoid serum had been added, were shown alongside of others which had not been treated, and the contrast between the active and incessantly moving bacilli of the latter, and the motionless, matted and coagulated-looking germs of the former, was most striking.

A paper upon

THE PROPHYLAXIS OF TYPHOID,

was read by DR. ELIOT WOODBRIDGE of Ohio, but inasmuch as all references to treatment had been ruled out of it by the Sifting Committee according to the by-laws, as the author took pains to explain in his introductory remarks it was like "the play of Hamlet with the part of Hamlet omitted," and elicited no discussion.

Three very suggestive papers came next upon

THE USE OF FORMALDEHYDE AS A DISINFECTANT,

by PROFESSOR FRANKLIN C. ROBINSON of Bowdoin, and DRS. J. J. KINYOUN and E. A. DE SCHWEINITZ of Washington. A lamp for its generation was exhibited by the last-named, and all papers cited remarkable instances of its penetrating and sterilizing powers. In one experiment, infectious matter was introduced into the filling of mattresses, also smeared upon their surface and lightly rolled up inside them, and in both cases complete sterilization was effected by a comparatively short "charging" of the room with the vapor. It certainly seems as if this agent bid fair to become the chief reliance n house and car disinfection.

At the public session, in the evening, no little interest was excited by DR. ALBERT L. GIHON'S paper upon

THE BICYCLE IN ITS SANITARY ASPECTS.

It was a picturesque and dramatic arraignment of the wheel for its evil effects upon both sexes: upon men by humping the back, cramping the chest, and straining the heart, and upon women by throwing the weight of the body upon the perineum. The writer viewed with concern the prevalence of "scorching," and the idiotic attitudes necessitated by it, which, in his opinion, caused the vast majority of those who rode to receive more injury than benefit from the exercise. In the gentler sex he deplored first of all "the amazing revelations, for which bicycle costumes and their involuntary displays are responsible, of spindle-shanks, knock-knees, and less objectionable bow-legs," which "the machine" simply inflicts upon a suffering public without doing anything effective to remedy. On behalf of the esthetic sensibilities of the community he solemnly warned "the attenuated maiden" that "leather leggings and thick stockings only make her lack of symmetry more conspicuous," and the "stout matron, for whom no anatomical seat can be wide enough," that her "too-well-delineated outlines look much better when decorously veiled by a skirt." The day, he hoped, would soon come when "all women will realize that the spectacle of clumsily clad legs, working up and down like piston-rods, is not attractive to others, and is, after a while, monotonous and wearisome to themselves." Besides which it is unhealthy, because the horn of the saddle presses upon the perineum and threatens the welfare of generations yet unborn. The narrow saddle, with its hard horn, supports the woman bicyclist "as upon the point of a wedge," and, by its local injurious effects, far overbalances any value as exercise possessed by the wheel.

The discussion was opened by DR. ELIZA MOSHER of Ann Arbor, Mich., who, from the standpoint of a practising gynecologist, vigorously attacked Dr. Gihon's position and disputed most of his assertions. Intemperance is, of course, injurious here as elsewhere, but in her experience the vast majority of women riders were benefited in every way physically by the use of the wheel. The mysterious evils spoken of by Dr. Gihon might occur, but she had never met with a single case as yet, and on the other hand, had seen "woman after woman and girl after girl, by riding a bicycle, recover from maladies of which I had been unable to cure her before." As a means of healthful, vigorous exercise, an emancipator from the tyranny of dress, and an exhilarating relief from worry and nerve-strain, the bicycle had no equal.

The report of the committee on Alcoholic Drinks was a most refreshing piece of manly, scientific frankness. It boldly declared that the confusing and inclusion of the moderate drinker with the habitual drunkard, *à la* Murphy, was extremely harmful, and that the promotion of the regular dietetic use of vinous and light malt liquors was the best means of combating drunkenness. As the most practical remedies for the abuse of alcohol the committee recommended the increase of taxation upon distilled liquors, its removal or great diminution upon light wines, beer, cider, etc., a sanitary inspection of all drinks

sold over bars, and the encouragement of good wine-culture and good wine-making. The report closed with the ringing declaration: "Temperance is to be recommended rather than prohibition. We are heartily in favor of temperance or moderate drinking, and are as heartily opposed to prohibition." The remainder of the evening was devoted to consideration of the management of public baths.

FRIDAY MORNING, SEPTEMBER 18TH.

The last session of the Association was called to order by President Liceaga with an almost undiminished number of delegates in attendance. A considerable amount of unfinished and executive business was disposed of before a sudden and somewhat unexpected interest was developed by the report of the Advisory Council recommending Toronto as the next place of meeting. This seemed to cause such difference of opinion in the meeting that a vote was called for, and Nashville and Philadelphia both having been placed in nomination, a large majority of the delegates were found to prefer the latter city, which, accordingly, was decided upon. Dr. H. B. Horlbeck of Charleston, S. C., was elected president for the coming year; Dr. Peter Bryce of Toronto, first vice-president, and Dr. Ernest Wende of Buffalo, second vice-president.

JOSÉ RAMIREZ, M.D., of Yucatan, presented an abstract of a valuable paper

ON STATISTICS OF VACCINATION AND MORTALITY FROM SMALLPOX IN THE CITY OF MEXICO.

There has been, fortunately, practically no popular opposition to vaccination in the Sister Republic, and as it has been compulsory since 1891, nearly every individual in the City of Mexico has been protected by its performance. The result has been that, whereas smallpox used to form quite an important factor in the death-rate within recent years, it has now practically ceased to figure in the returns. Deaths from it are rare and usually occur in foreigners or recent arrivals from other States who have not been vaccinated.

A. N. BELL, M.D., of New York, followed with a brief but pointed paper upon

DRUNKENNESS, A VICE; IT SHOULD BE SO TREATED.

He took the ground that neither heredity nor disease had much to do with the causation of drunkenness. Inherited appetite for liquor was usually proved by finding one or more drunkards among the patient's ancestors or family. These could be found readily in almost every family (not even excluding the families of those present), if the search were pushed far enough. It may become a disease by neglect and repeated indulgence, and of course give rise to diseased conditions, but primarily it is a vice and not a disease. He pointed out that drunkenness is regularly associated with and leads to crime, pauperism, vice, and every form of moral degradation rather than physical. Drunkenness should be made a misdemeanor with increasing punishments, while the habitual drunkard should be first deprived of civil rights, and finally, if he persisted, confined in an appropriate institution, permanently or till such time as he gave good evidence of reformation, on the plan, in fact, of the "indeterminate sentence," as now applied to other habitual criminals.

Other papers were read, among them: "On the Prophylaxis of Scurvy by Pulque," by Francisco M. Baca, M.D., Puebla, Mex.; "The Relation of Noises to Public Health," by W. C. Krauss, M.D., of Buffalo; one which was not inappropriately titled "The Protection of the Innocent from Gonorrhea," by Ferd. C. Valentine, M.D. of New York (by "deep injection" methods that alone are sure to cure in ten days); and lastly on "The Necessity of Isolating Beds in Hospitals by Means of Windows Between Them," by Jesus E. Monjarás, M.D., of San Luis Potosi, Mex., but owing to the crowded program and nearness of the hour of adjournment, little discussion was possible. The one fault of the entire meeting was the attempt to discuss too large a number of papers at each session, from eight to fourteen being listed for every sitting, so that many of them had to be read by title or abstract and the discussions badly crippled. After an eloquent address in Spanish by President Liceaga, translated by his son, the Association adjourned to meet in Philadelphia next October.

SECOND INTERNATIONAL CONGRESS OF GYNECOLOGY AND OBSTETRICS.

Held at Geneva, Switzerland, from August 31 to September 5, 1896.

THE address of welcome was made by Dr. Bétrix, who announced that representatives were present from France, Great Britain, Italy, Belgium, Spain, Sweden, the United States of America, Argentine Republic, and Switzerland. M. Lachenal, the Swiss President, dwelt on the great advances recently made in the diseases of women. Professor Runcin referred to the loss sustained by the Congress through the death of M. Vultict.

At the session of September 1st DR. G. BOUILLY of Paris, spoke on

THE TREATMENT OF PELVIC SUPPURATIONS.

Upon the knowledge of the exact cause of pelvic suppuration must rest the choice of the method of treatment. Considered surgically, pelvic abscesses may be divided into four classes:

(1) Abscess of the cellular tissue, parametritis. (2) Abscess of the tubes or ovaries, pyosalpingitis and suppurative oöphoritis. (3) Peritoneal abscess, pelvic peritonitis, suppurative hematocele. (4) Complicated abscesses, involving more than one organ, and possibly with sinuses leading to the skin or elsewhere.

Rejecting puncture as to-day unworthy of consideration, except as a means of diagnosis, the three methods of treatment are:

(1) Incision and drainage, abdominal or vaginal; (2) Exposure or removal of suppurating pockets by laparotomy, or (3) By the vagina, including hysterectomy, with or without morcellement of the uterus: (*a*) Removal of small unilateral collections per vaginam, without hysterectomy; (*b*) Removal by laparotomy of uterus and adnexæ.

Simple incision, with drainage, is the method of choice, and is applicable in acute abscesses, whether cellular or

peritoneal in origin, such as post-puerperal, or gonorrheal, or following operation, or in suppurative hematoceles. Thanks to better vaginal asepsis, and especially better drainage, incision and drainage are also applicable to many cases of encysted abscesses from the adnexæ. This treatment is most successful if the sac is unilateral, thin-walled, and situated low down. This simple operation give more cures than one would at first believe, and if it fail, a persisting sinus does not complicate a possible later vaginal hysterectomy.

Laparotomy and vaginal hysterectomy are not rival operations in the treatment of pelvic suppuration; each has its indications. If the lesion is surely or probably unilateral, especially in a young woman, laparotomy, as affording an opportunity for inspection of the adnexæ, is the operation of choice. This consideration is less strongly urged when there is a probability of the suppurative nature of the trouble than in case of cysts, etc., as suppuration is likely to affect both sides. In case of bilateral lesions, the situation of the purulent sacs, with reference to the uterus and vaginal vault, is important in determining the choice of operation. With these restrictions, vaginal hysterectomy can accomplish all that laparotomy can, and in some cases, by the former operation, conditions can be reached and cured that could not be reached by laparotomy without great danger. In abscesses separated from the peritoneal cavity by dense fibrous tissue, or in chronic abscesses with or without fistulæ, whose removal would be difficult or impossible, the removal of the uterus per vaginam is an operation relatively simple, and good drainage is thus secured. To attempt, in these cases, the enucleation of the abscesses is unnecessarily to increase the risk to the patient.

The operative results obtained by laparotomy ought not to be held to be proof of the superiority of that operation, as the recent figures of vaginal hysterectomy are much better than the former ones, and the cases subjected to laparotomy are simpler than those in which vaginal hysterectomy is performed. The immediate recovery from the latter is more rapid and the ultimate results are better.

In conclusion, in the large majority of cases in which incision and drainage are insufficient, vaginal hysterectomy represents the method *par excellence* of treatment of pelvic suppuration, and only when it is contraindicated is laparotomy in order.

DR. HOWARD KELLY of Baltimore, said that vaginal puncture ought to be attempted before recourse is had to laparotomy in the following cases:

(1) When there are compact inflammatory pus-cavities at the sides of or behind the uterus, in close contact with the vagina and separated by adhesions from the peritoneal cavity; (2) in old cases, in which a fistula exists opening into the rectum or bladder, or through the abdominal wall; (3) in cases of large hydrosalpinx easily accessible per vaginam; (4) for encysted pelvic peritonitis.

In such cases this operation presents the following advantages: (1) It is not followed by nervous troubles, as is the case after hystero-salpingo-oöphorectomy; (2) the functions of menstruation and conception are preserved; (3) rapid recovery—eight to ten days; (4) no danger of wounding the intestine, as may occur during difficult pelvic enucleation; (5) mortality less than two per cent.

Its dangers are: (1) Hemorrhage; (2) perforation of the rectum or the intestine (two cases); (3) penetration of the peritoneal cavity and death from infection (one case).

The following conditions will prevent complete recovery: (1) The presence of cellulitis extending to the pelvic walls and compressing the nerves and vessels; (2) contraction of the rectum due to the presence of perirectal inflammatory tissue; such tissue will persist and cause post-operative troubles.

In some cases exploratory incision will be necessary: (1) To determine the exact condition and the necessity for radical operation; (2) to avoid puncture of the intestine if lying between the abscess cavity and the vaginal wall; (3) to facilitate complete evacuation of the pus or to guide the instrument into old pockets.

Vaginal puncture is indicated especially in young married women and girls, upon whom a radical operation ought not to be performed until conservative treatment has been exhausted.

If an exploratory incision is made, the hands which make the incision and the examination through the wound, should not be used in the vaginal part of the operation. The steps of the procedure would then come in the following order: (1) Disinfection of the vagina; (2) selection of the spot most favorable for puncture, avoiding arteries, ureters, and bladder; (3) introduction of the finger or the scissors into the abscess cavity and enlargement of the opening; (4) the use, if necessary, of large uterine dilators; (5) lavage of the abscess cavity with normal salt solution, if there is no reason to suspect a communication with the abdominal cavity; (6) drainage by gauze, rubber tube, or silver cannula.

Conservative operative treatment would consist of (1) separation of adherent purulent tubes from the vagina and their puncture; (2) removal of the tube or ovary of one side.

The indications for salpingo-oöphorectomy, either simple or including one horn of the uterus, are: (1) Simple pyosalpinx. (2) Simple pyosalpinx with an isolated purulent focus in the uterine horn.

The indications for hysterosalpingo-oöphorectomy are: (1) Double simple pyosalpinx inaccessible to vaginal puncture. (2) Double adherent pyosalpinx, accompanied by purulent metritis and endometritis. (3) Pelvic abscess accompanied by appendicitis. (4) Pelvic abscess complicated by adhesions, comprising the small intestines. (5) Pelvic abscess with fistulous tract opening into the sigmoid flexure or the small intestine. (6) Pelvic abscess accompanied with myomata.

The method of performing hysterosalpingo-oöphorectomy by operating from left to right, or vice versa, presents the following advantages: (1) Great facility. (2) Easy recognition of the state of the lesions. (3) Easy removal of the tumors because they are attacked at the side where they are least adherent. (4) The vessels are easily clamped. (5) Abdominal drainage is unnecessary. (6)

Avoidance of post-operative residues, adhesions, intestinal obstruction, peritonitis.

In order to drain through the uterine pedicle the cervical canal is dilated, and the gauze is introduced from the abdomen through the cervix into the vagina. The peritoneum is sutured above the uterine pedicle.

DR. SANGER of Leipzig, gave the following principles as governing German gynecologists in cases of pelvic suppurations:

(1) Indications must be most serious before an operation is resorted to. (2) The operation should be the most simple possible. (3) One must always choose the most appropriate operation for the given case in relying for that on the clinical, anatomical, and bacteriological diagnosis.

The greater number of gynecologists reject vaginal hysterectomy in cases of frequent pelvic suppurations; they prefer, as a rule, to operate by the abdomen.

The puncture is limited to the cases of encapsulated abscesses or to purulent collections in closed organs. One cannot hope for success unless the pus is sterile. In this manner one must treat only those cases where the purulent collection can be reached without crossing the cavity of the pelvis.

The incision is indicated in intraperitoneal or extraperitoneal purulent collections.

The incision is nearly always the preferred operation in chronic or single purulent collections where the pus is sterile. The incision is also indicated in certain acute cases, such as suppurations in Douglas' cul-de-sac.

Celiotomy is always indicated in case of purulent collections which form by their dimensions a real tumor. Celiotomy and drainage are all that are necessary in the case of encapsulated foci, unless the annexes and other organs are diseased and must be removed.

All suppurated organs must be entirely removed.

The indications for drainage are: (1) When virulent pus has contaminated the hand of the operator or an intact part of the abdomen. (2) When hemostasis is not perfect or there may have been at the same time a discharge of pus. (3) When there is a fistula or a perforation of the intestines.

The drainage (abdomino-vaginal) with gauze does not guarantee either the perfect flow of the secretions or the isolation of the rest of the abdominal cavity, unless a peritoneal band may have been formed above.

DR. RICHELOT of Paris, said that it is not possible to decide exclusively for any one of the three methods; that each had its advantages.

The direct vaginal incision, the oldest method, is conservative, and more easily performed than a hysterectomy, but it is not adapted to all cases. It does not always succeed. Often a focus of suppuration is left behind when the puncture has healed, and this may give rise to new infection, a new abscess, and a return of all the trouble which it was intended to relieve. It is especially indicated in recent cases, and in *post-partum* suppuration, when, owing to the great friability of the tissues, extirpation is especially dangerous.

Laparotomy, though immediately successful, often fails in that it leaves in the pelvis, a congested, painful, and often infected uterus, which may render necessary a secondary hysterectomy. Its true field is where there are organs to be preserved. The age of the patient and the certainty, or the hope of a unilateral lesion, are also to be considered.

Vaginal hysterectomy in his hands has given a mortality of only 4½ per cent. in 569 cases. After the removal of the uterus, the tubes and ovaries give much less trouble than the presence of the uterus when they have been removed.

The popularity of vaginal hysterectomy rests on the use of clamps. It is no disgrace to use a great many, and he never introduces the tamponade as long as there is a drop of blood.

DR. HARTMANN of Paris, called attention to the fact that many patients are cured by medical treatment. It is therefore wise in all cases before operation to see what can be accomplished by rest in bed and vaginal antisepsis. Intrauterine treatment, dilatation, and curetting, are sometimes successful, but never in cases in which there are large circumscribed collections.

DR. HENROTIN of Chicago, emphasized the importance of an incision into the posterior cul-de-sac with the first sign of genital infection. By this means one obtains often only a slight serous discharge, which becomes purulent only after some days. The finger is introduced and exudates, if found, are broken up. If there is a very extensive exudate, an opening is also made in the anterior fornix. This early treatment prevents more serious trouble, and is far superior to curetting the uterus, which has been known to hasten the spread of the infection.

DR. SABINO COELHO of Lisbon, has operated upon twelve patients by an incision through the anterior vaginal vault, as recommended by Martin. Pyosalpinx existed in nine cases, suppurative oöphoritis in the other three. The tumors ranged in size from a mandarin to an orange. All the operations were made without any accident, and the speaker holds that in unilateral cases this operation is preferable to hysterectomy, as it leaves the woman still capable of conception, and is preferable to laparotomy as it avoids the abdominal scar and its dangers.

DR. REYNIER of Paris, thought that there was danger in leaving behind inflamed adnexæ. These often give rise to troubles requiring further operation. Of the two, he was inclined to think contrary to Segond, that the remaining adnexæ were more troublesome than the remaining isolated uterus. He is in favor of laparotomy, which enables the operator to see what he is doing, and to make a clean operation by the removal of all diseased tissue.

DR. LAROZENNE of Lyons has tried to make an incision stopping four or five centimeters from the pubis. He rarely has hernias by his method.

DR. QUÉREL of Marsailles, practises buried suture, closing the peritoneum with catgut. The muscles and aponeurosis are reunited by braided silk. For large hernias he inserts a layer of calcified bone between the aponeurosis and the muscle.

DR. CONDAMIN of Lyons, practises the lacing suture for large hernias and umbilical hernias.

(To be continued.)

ANNOUNCEMENT.

ANTITOXIN COLLECTIVE INVESTIGATION (SECOND) AMERICAN PEDIATRIC SOCIETY.

To the Profession:

The American Pediatric Society are encouraged to ask the coöperation of the profession in a further collective investigation. Laryngeal diphtheria is believed to furnish a crucial test for antitoxin; the present aim is to ascertain (1) what percentage of cases of laryngeal diphtheria recover without operation, under antitoxin treatment; (2) what percentage of operative cases recover.

The Socie y asks for records of cases of *diphtheria involving the larynx, whether operated upon or not, occurring in private practice in the United States and Canada, treated with antitoxin.* It is expected that cases occurring this year will probably be treated with reliable preparations of the serum, will be treated early, and will be given efficient doses. In order to secure data which shall make the tables complete, circulars containing blanks for ten cases have been printed, and are now ready for distribution. It is desired that physicians shall fill out the circulars as cases occur, not trusting to memory, and shall urge their friends having similar cases, to report them. Circulars can be had by applying to the committee (address below). Several groups of cases in the first investigation arrived too late and were lost to the report. It is desired that circulars as soon as filled (ten cases) be returned to the committtee. The collection of cases must close at the end of March, 1897. The second report is designed to be a study of cases occurring between the closing of the first report, May 1, 1896, and the closing of the present collective investigation, April 1, 1897.

For extra circulars (blanks), for returning circulars (filled), and for further information please address the chairman of the committee:

W. P. NORTHRUP, M.D.

No. 57 EAST SEVENTY-NINTH STREET,
NEW YORK, October 1, 1896.

[To secure as great uniformity as possible in the treatment, the following suggestions are offered as they appeared in the resolutions of the Pediatric Society on accepting the first report:

1. *Dosage.*—For a child over two years old, the dosage of antitoxin should be, in all laryngeal cases with stenosis, and in all other severe cases, 1500 to 2000 units for the first injection, to be repeated in from eighteen to twenty-four hours if there is no improvement; a third dose after a similar interval, if necessary. For severe cases in children under two years, and for mild cases over that age, the initial dose should be 1000 units, to be repeated as above if necessary; a second dose is not usually required. The dosage should always be estimated in antitoxin units, and not of the amount of serum.

2. *Quality of Antitoxin.*—The most concentrated strength of an absolutely reliable preparation.

3. *Time of Administration.*—Antitoxin should be administered as early as possible on a clinical diagnosis, not waiting for a bacteriological culture. However late the first observation is made, an injection should be given, unless the progress of the case is favorable and satisfactory.]

REVIEWS.

SYSTEM OF SURGERY. Edited by FREDERIC S. DENNIS, M.D., Professor of the Principles and Practice of Surgery, Bellevue Hospital Medical College, etc., etc., assisted by JOHN S. BILLINGS, M.D., LL.D.Edin. and Harv.; D.C.L. Oxon.; Deputy Surgeon-General U. S. A. Vol. IV. Tumors—Hernia—Surgery of the Alimentary Canal—Appendicitis—Surgery of the Liver and Biliary Passages, of the Uterus, of the Ovaries and Tubes — Gynecological Surgery — Symphysiotomy — Surgery of the Thyroid—Surgical Peculiarities of the Negro—Surgery of the Female Breast—Use of the Röntgen Rays in Surgery. Profusely Illustrated, 8 vol.; pp. 970. New York and Philadelphia: Lea Brothers & Co.; 1896.

As may appear from the list of authors concerned in its preparation, this final volume maintains the standard of its predecessors in the series. Among the subjects discussed in it are some in which the most conspicuous of the advances of modern surgery have been made.

It opens with an article on tumors, by the editor. This, which occupies one hundred pages, is supplemented by a brief essay on the microscopic appearances of these structures, from the pen of Dr. E. K. Dunham. The nomenclature and classification of new growths here given is credited to Dr. J. W. S. Gouley. It does not differ materially from that recently proposed by Sutton, but seems to us to be needlessly complicated by the multiplication of terms and subdivisions. With regard to treatment, space is deservedly given to the discussion of Coley's method of dealing with inoperable cases by the injection of mixed toxins. Some of the reported results are so striking as to suggest the idea that further experience may lead to an extension of this procedure to some of the cases now regarded as amenable to operation.

Abdominal surgery next comes under consideration, in a series of articles by well-known authors. Hernia is discussed by Drs. Bull and Coley of New York. The surgery of the alimentary canal, from the pharynx to the ileocecal junction, has been assigned to Dr. M. H. Richardson of Boston, who has had the assistance of Dr. Farrar Cobb of the same city. Appendicitis is made the subject of two articles, the first by Dr. Hartley of New York, on the clinical and pathological features of the disease, the second, by Dr. McBurney, on its surgical treatment. A chapter on the surgery of the large intestine is contributed by Dr. L. S. Pilcher of Brooklyn, and one on that of the liver and biliary passages by Dr. Robert Abbe of New York.

The four following chapters are upon gynecological topics. Dr. William M. Polk of New York, takes up the surgical disorders and diseases of the uterus, Dr. Joseph Taber Johnson of Washington, D. C., those of the ovaries and tubes. Minor gynecological surgery is set forth by

Dr. H. C. Coe of New York; while a separate article by Dr. W. T. Lusk of New York, is devoted to symphysiotomy.

The surgery of the thyroid gland is the subject of a special chapter by Drs. R. F. Weir and E. M. Foote of New York; and this is followed by a discussion of the surgical peculiarities of the negro, by Dr. Rudolph Matas of New Orleans. Further study in this direction, and a comparison of the varying features and susceptibilities of different races, would seem to be invited by the opportunities for such investigation afforded in several of the great cities of the country.

The subject of diseases of the breast is treated by the editor himself. The volume concludes with a brief sketch, by Dr. W. W. Keen of Philadelphia, of skiagraphy by means of the Röntgen or X-rays.

All the articles now enumerated are the work of men of reading, observation, and experience, and are fully "up to date." With their teachings we have no fault to find; but we think the student, and perhaps the average practitioner, will sometimes wish that they had been written on a lower plane, or at least with more of elementary detail. For instance, the article on the X-rays opens with the statement that pictures were taken "by means of certain rays emanating from a Crookes' vacuum tube." But unless the reader happens to know what a Crookes' vacuum tube is, and how rays are made to emanate from it, and how "certain rays" differ from other rays emanating from it, the whole matter still remains as Cicero's speech was to Casca, Greek to him.

Abundant evidence is afforded throughout this volume of the familiarity of the authors with foreign, and especially with German, literature. We cannot but note with regret that they seem to have found in the writings and labors of their fellow countrymen almost nothing worthy of citation or reference.

The mechanical execution of this book is highly creditable, and the illustrations are, for the most part, exceptionally fine.

A Treatise on Appendicitis. By John B. Deaver, M.D. Philadelphia: P. Blakiston & Co. Pp. 164.

The author of this treatise states in the preface that the work "has been prompted by the belief that the importance of this affection entitles it to a more thorough and exhaustive study than has usually heretofore been accorded it." This is to be construed into a promise to the purchaser of the book that it shall contain something which has not appeared heretofore, and that, with this in view, a "more thorough and exhaustive study" will be given to the subject than has been given by previous writers. No one will question the importance of the affection, and in view of this, a promise based upon such a statement of fact becomes a most solemn obligation. The expectation of the reader is still further enhanced by the assertion, duly set forth, that "the observations herein contained are the result of an experience in the treatment of over five hundred cases." The concluding sentence of the book, however, shows that these were all operative cases, and it is therefore fair to assume that the experience of the author is confined to the operative treatment of the disease.

He who seeks for something new in the author's presentation of the subject will be disappointed. The chapter upon "History" is largely a compilation from Talamon's "Appendicite et Périty phlite," published in 1892, and the more recent work of Hawkins upon the "Diseases of the Vermiform Appendix" (1895).

In the chapter upon "Etiology," the usually recognized causes of the disease are given, but no new light is thrown upon the subject. He follows Talamon in the belief that acute indigestion plays a very important rôle in the etiology of appendicitis, and, while admitting that seeds and other foreign bodies have been found in the appendix, contends, with most recent writers, that, in the large majority of cases, the supposed seeds were fecal concretions.

In the chapter upon "Pathology," the four stages given by Fowler are followed. The lessened vitality and anatomic peculiarities of the organ are acknowledged to be reasons for the more frequent invasion of the appendix by microörganisms, as compared with other portions of the intestinal tract. In the present state of our knowledge upon the subject, the statement that "the most important determining cause of an invasion by the microörganisms is the existing virulence of the colon bacillus," is scarcely warranted.

Twenty-seven pages are devoted to the subject of diagnosis. Issue might be taken with the author upon the accuracy of the statement contained in the opening paragraph of the chapter, to wit, "When the three cardinal symptoms, viz., sudden onset of acute abdominal pain, with or without vomiting, occurring in one previously well; unilateral rigidity of the lower abdominal wall; tenderness over the site of the appendix—the diagnosis of appendicitis is *unexceptionally* warranted." (Italics ours). This statement fails to take into account the possibilities of a ruptured right tubal pregnancy, rupture of a right pyosalpinx in a patient with few or no previous symptoms, and twisting of the pedicle of a small right-sided ovarian cystoma, to say nothing of acute intestinal obstruction in the neighborhood of the ileocecal valve, all of which, while they fully justify the operator in opening the abdomen, may lead to diagnostic error if only the three symptoms mentioned are taken into account.

The statement made by an eminent medical authority that ninety-five per cent. recover without operation, is undoubtedly based upon insufficient diagnostic data, and is none too vigorously opposed by the author. While it is probably true that there is a certain and definite proportion of cases which recover without operation, it is also true, as stated by our author, that "it is impossible to foretell what will be the outcome of any attack."

In the matter of treatment, the author states that "my observation has forced me to the conclusion that there is but one course to pursue in order to obtain the best possible results, viz., to remove the appendix as soon as the diagnosis has been made." Without doubt many medical practitioners will object to this, and will back up their objection by the recital of cases which have recovered without operation.

It is probably true that much may be said upon both sides of the question when the line is as closely drawn as our author draws it, and it is not too much to say that indiscriminate opening of the abdomen at the hands of incompetent operators may be responsible for as many deaths as over-conservatism in the expectant treatment of appendicitis.

Many of the plates are placed in the book without reference to the relevancy of the accompanying text, and have facing them pages occupied entirely by the history of cases, instead of matter descriptive of the plates.

The general mechanical makeup of the book is such as to reflect credit upon the publishing firm whose name appears upon the title page.

DIE KRANKHEITEN DER WARMEN LANDER. Ein Handbuch für Aerzte, von DR. B. SCHEUBE. Jena, 1896. Verlag von Gustav Fischer.

[Tropical Diseases. A Handbook for Physicians, by Dr. B. Scheube. Published by Gustav Fischer. Jena, 1896].

THE author of this book is already well-known to the medical profession through his writings on beriberi; the most authoritative in existence. He was formerly professor in the medical school at Kioto, and his training and experience entitle him to speak positively on tropical diseases. We have no hesitation in saying that this book surpasses every one dealing with the same subject that has come to our notice. The 450 pages comprise five chapters which deal respectively with, (1) general infectious diseases; (2) intoxication diseases; (3) diseases caused by animal parasites; (4) organic diseases, and (5) unclassified diseases. The first and fourth parts will be found most interesting and instructive to physicians of the Occident and temperate climates, although one cannot read any of the other chapters without enlarging his medical knowledge and modifying his point of view. Under the general infectious diseases detailed and elaborate descriptions are given; among others of bubo-pest, an infectious disease of great acuteness and severity, characterized by inflammation of the glands, development of carbuncles, great pyrexia, and profound prostration; dengue fever; yellow fever; Mediterranean or Neapolitan fever; malaria of the tropics; beriberi, and lepra arabum. Each of these are discussed in the completest way; first the name, the natural history, and geographical distribution; the etiology; the clinical picture, or symptom-complex and its variations; the diagnosis, differential diagnosis, and prognosis; the pathological anatomy, and, finally, the therapy. And under the latter the prophylaxis, as it deserves, receives detailed consideration. In fact, one of the most valuable features of the work, and one that cannot fail to be attended with material benefit, is the prominence given to discussion of prophylactic measures. In no part of the book is this more apparent than in the discussion of beriberi and malaria, two diseases almost completely preventable, which are, at least, robbed of their malignancy by the observance of general and personal hygienic measures. The etiology of malarial fevers is handled in a most masterful manner; the various parasites—the quartan, the tertian, the quotidian, the malignant tertian, the half moon-shaped of Laveran, the *corpora flagella* or polymitous form—are all taken up in detail, and their claims for preëminency as causative factors carefully weighed.

The chapter on beriberi is sufficiently referred to when we say that it is in reality a digest of the author's book on that form of epidemic multiple neuritis, to which the name beriberi is given. His description must remain a standard from a clinical standpoint for all time, and from a pathological standpoint until the bacteriological investigation reveals the real causes of the disease.

In the chapter on intoxication diseases pellagra is described.

The least satisfactory chapters in the book, and the ones that do not materially advance our knowledge of the diseases considered, either from a historical or from a clinico-pathological point of view, are those devoted to sleeping sickness of the negro, amok, and latah. These are evidently included, not that the author has anything new or critical to say about them, in fact his statements anent these are almost entirely based on the observations of others, but that he may insure completeness. Considered as such, they fulfil their purpose.

In a brief notice the merits of a book, like the one under consideration, receives but inadequate mention, but when we say that, in our opinion, it contributes to the illumination of some of the most destructive and obscure diseases which afflict mankind, we shall have sufficiently manifested our desire to speak well of it.

BLIND LEADERS OF THE BLIND. A Novel, by JAMES R. COCKE, M.D. Lee & Shepard, publishers. Boston.

THIS book has no *raison d'être* whatever—neither beauty of style, nor appeal to refined emotions and sentiments, nor yet the development of a consistent story is to be found within its pages. The book is a collection of incidents, very naïvely told, loosely strung together, and appealing to a love of the morbid and pathological. It would hardly be possible for us even to enumerate the number of murders, diseases, crimes against person and properties, not to speak of the absurd diagnoses and fulsome adulation, and advertisement of false prophets in hypnotism, in which the book abounds. The public cannot be instructed by this book; it needs to be warned against statements made with a show of special knowledge on the part of a physician who has written a work on hypnotism. He indicates the possibility of a blind man, who had been suffering total blindness from before his fifth year, seeing the sun, and the moon, with its shimmer upon the water at night, by means of a magnet and the touch of his loved one, as though directing his mental gaze hither and thither in unison with the movements of her eyes. Preposterous and ridiculous as this is, it is fraught with such danger to the unthinking and unprofessional reader that the publication of such a book by a physician can be regarded in no other way than reprehensible. Of the making of books there is no end. Fortunately we are not obliged to read them all.